DAIKIN

altherma

INSTALLATION MANUAL

Daikin Altherma outdoor unit

EMRQ8AAY1
EMRQ10AAY1
EMRQ12AAY1
EMRQ14AAY1
EMRQ16AAY1

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CE - CONFORMITEITSVERKLARING

CE - DECLARACION-DE-CONFORMIDAD
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CE - ΔΗΛΩΣΗ ΣΥΜΜΟΡΦΩΣΗΣ

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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-BEYANI

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 felelősségre 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:

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* = , , 1, 2, 3, ..., 9

01 are in conformity with the following standard(s) or other normative document(s), provided that these are used in accordance with our instructions:
02 der/den folgenden Norm(en) oder einem anderen Normdokument oder -dokumenten entspricht/entsprechen, unter der Voraussetzung, daß sie gemäß unseren Anweisungen eingesetzt werden:
03 sont conformes à la/aux norme(s) ou autre(s) document(s) normatif(s), pour autant qu'ils soient utilisés conformément à nos instructions:
04 conform de volgende norm(en) of één of meer andere bindende documenten zijn, op voorwaarde dat ze worden gebruikt overeenkomstig onze instructies:
05 están en conformidad con la(s) siguiente(s) norma(s) u otro(s) documento(s) normativo(s), siempre que sean utilizados de acuerdo con nuestras instrucciones:
06 sono conformi al(i) seguente(i) standard(s) o altro(i) documento(i) a carattere normativo, a patto che vengano usati in conformità alle nostre istruzioni:
07 είναι σύμφωνα με το(α) ακόλουθο(α) πρότυπο(α) ή άλλο έγγραφο(α) κανονισμών, υπό την προϋπόθεση ότι χρησιμοποιούνται σύμφωνα με τις οδηγίες μας:
08 estão em conformidade com a(s) seguinte(s) norma(s) ou outro(s) documento(s) normativo(s), desde que estes sejam utilizados de acordo com as nossas instruções:
09 соответствуют следующим стандартам или другим нормативным документам, при условии их использования согласно нашим инструкциям:
10 overholder følgende standard(er) eller andet/andre retningsgivende dokument(er), forudsat at disse anvendes i henhold til vore instrukser:
11 respektive utrustning är utförd i överensstämmelse med och följer följande standard(er) eller andra normgivande dokument, under förutsättning att användning sker i överensstämmelse med våra instruktioner:
12 respektive utstyr er i overensstemmelse med følgende standard(er) eller andre normgivende dokument(er), under forutssetning av at disse brukes i henhold til våre instrukser:
13 vastaavat seuraavien standardien ja muiden ohjeellisten dokumenttien vaatimuksia edellyttäen, että niitä käytetään ohjeidemme mukaisesti:
14 za předpokladu, že jsou využívány v souladu s našimi pokyny, odpovídají následujícím normám nebo normativním dokumentům:
15 u skladu sa slijedećim standardom(ima) ili drugim normativnim dokumentom(ima), uz uvjet da se oni koriste u skladu s našim uputama:
16 megfelelnek az alábbi szabvány(ok)nak vagy egyéb irányadó dokumentum(ok)nak, ha azokat előírás szerint használják:
17 spełniają wymogi następujących norm i innych dokumentów normalizacyjnych, pod warunkiem że używane są zgodnie z naszymi instrukcjami:
18 sunt în conformitate cu următorul (următoarele) standard(e) sau alt(e) document(e) normativ(e), cu condiţia ca acestea să fie utilizate în conformitate cu instrucţiunile noastre:
19 skladni z naslednjimi standardi in drugimi normativi, pod pogojem, da se uporabljajo v skladu z našimi navodili:
20 on vastavuses järgmis(t)e standardi(te)ga või teiste normatiivsete dokumentidega, kui neid kasutatakse vastavalt meie juhenditele:
21 съответстват на следните стандарти или други нормативни документи, при условие, че се използват съгласно нашите инструкции:
22 atitinka žemiau nurodytus standartus ir (arba) kitus norminius dokumentus su sąlyga, kad yra naudojami pagal mūsų nurodymus:
23 tad, ja lietoti atbilstoši ražotāja norādījumiem, atbilst sekojošiem standartiem un citiem normatīviem dokumentiem:
24 sú v zhode s nasledovnou(ými) normou(ami) alebo iným(i) normatívnym(i) dokumentom(ami), za predpokladu, že sa používajú v súlade s našim návodom:
25 ürünün, talimatlarımıza göre kullanılması koşuluyla aşağıdaki standartlar ve norm belirten belgelerle uyumludur:

EN60335-2-40,

01 following the provisions of:
02 gemäß den Vorschriften der:
03 conformément aux stipulations des:
04 overeenkomstig de bepalingen van:
05 siguiendo las disposiciones de:
06 secondo le prescrizioni per:
07 με τήρηση των διατάξεων των:
08 de acordo com o previsto em:
09 в соответствии с положениями:
10 under iagttagelse af bestemmelserne i:
11 enligt villkoren i:
12 gitt i henhold til bestemmelsene i:
13 noudattaen määräyksiä:
14 za dodržení ustanovení předpisu:
15 prema odredbama:
16 követi a(z):
17 zgodnie z postanowieniami Dyrektyw:
18 în urma prevederilor:
19 ob upoštevanju določb:
20 vastavalt nõuetele:
21 следвайки клаузите на:
22 laikantis nuostatų, pateikiamų:
23 ievērojot prasības, kas noteiktas:
24 održiavajúc ustanovenia:
25 bunun koşullarına uygun olarak:

Low Voltage 2006/95/EC
Machinery 2006/42/EC ***
Electromagnetic Compatibility 2004/108/EC *
Pressure Equipment 97/23/EC **

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

01 * as set out in **<A>** and judged positively by **<B>** according to the **Certificate <C>**.
** as set out in the Technical Construction File **<D>** and judged positively by **<E>** (Applied module **<F>**). **<G>**. Risk category **<H>**. Also refer to next page.
02 * wie in der **<A>** aufgeführt und von **<B>** positiv beurteilt gemäß **Zertifikat <C>**.
** wie in der Technischen Konstruktionsakte **<D>** aufgeführt und von **<E>** (Angewandtes Modul **<F>**) positiv ausgezeichnet gemäß. **<G>**. Risikoart **<H>**. Siehe auch nächste Seite.
03 * tel que définis dans **<A>** et évalué positivement par **<B>** conformément au **Certificat <C>**.
** tel que stipulé dans le Fichier de Construction Technique **<D>** et jugé positivement par **<E>** (Module appliqué **<F>**). **<G>**. Catégorie de risque **<H>**. Se reporter également à la page suivante.
04 * zoals vermeld in **<A>** en positief beoordeeld door **<B>** overeenkomstig **Certificaat <C>**.
** zoals vermeld in het Technisch Constructiedossier **<D>** en in orde bevonden door **<E>** (Toegepaste module **<F>**). **<G>**. Risicocategorie **<H>**. Zie ook de volgende pagina.
05 * como se establece en **<A>** y es valorado positivamente por **<B>** de acuerdo con el **Certificado <C>**.
** tal como se expone en el Archivo de Construcción Técnica **<D>** y juzgado positivamente por **<E>** (Modulo aplicado **<F>**). **<G>**. Categoría de riesgo **<H>**. Consulte también la siguiente página.
06 * delineato nel **<A>** e giudicato positivamente da **<B>** secondo il **Certificato <C>**.
** delineato nel File Tecnico di Costruzione **<D>** e giudicato positivamente da **<E>** (Modulo **<F>** applicato). **<G>**. Categoria di rischio **<H>**. Fare riferimento anche alla pagina successiva.
07 * όπως καθορίζεται στο **<A>** και κρίνεται θετικά από το **<B>** σύμφωνα με το **Πιστοποιητικό <C>**.
** όπως προσδιορίζεται στο Αρχείο Τεχνικής Κατασκευής **<D>** και κρίνεται θετικά από το **<E>** (Χρησιμοποιούμενη υπομονάδα **<F>**). **<G>**. Κατηγορία επικινδυνότητας **<H>**. Ανατρέξτε επίσης στην επόμενη σελίδα.
08 * tal como estabelecido em **<A>** e com o parecer positivo de **<B>** de acordo com o **Certificado <C>**.
** tal como estabelecido no Ficheiro Técnico de Construção **<D>** e com o parecer positivo de **<E>** (Módulo aplicado **<F>**). **<G>**. Categoria de risco **<H>**. Consultar também a página seguinte.
09 * как указано в **<A>** и в соответствии с положительным решением **<B>** согласно **Свидетельству <C>**.
** как указано в Досье технического толкования **<D>** и в соответствии с положительным решением **<E>** (Прикладной модуль **<F>**). **<G>**. Категория риска **<H>**. Также смотрите следующую страницу.
10 * som anført i **<A>** og positivt vurderet af **<B>** i henhold til **Certifikat <C>**.
** som anført i den Tekniske Konstruktionsfil **<D>** og positivt vurderet af **<E>** (Anvendt modul **<F>**). **<G>**. Risikoklasse **<H>**. Se også næste side.
11 * enligt **<A>** och godkänts av **<B>** enligt **Certifikatet <C>**.
** i i enlighet med den Tekniska Konstruktionsfilen **<D>** som positivt intygats av **<E>** (Fastsatt modul **<F>**). **<G>**. Riskkategori **<H>**. Se även nästa sida.
12 * som det fremkommer i **<A>** og gjennom positiv bedømmelse av **<B>** ifølge **Sertifikat <C>**.
** som det fremkommer i den Tekniske Konstruksjonsfilen **<D>** og gjennom positiv bedømmelse av **<E>** (Anvendt modul **<F>**). **<G>**. Risikokategori **<H>**. Se også neste side.
13 * jotka on esitetty asiakirjassa **<A>** ja jotka **<B>** on hyväksynyt **Sertifikaatin <C>** mukaisesti.
** jotka on esitetty Teknisessä Asiakirjassa **<D>** ja jotka **<E>** on hyväksynyt (Sovellettu moduli **<F>**). **<G>**. Vaaraluokka **<H>**. Katso myös seuraava sivu.
14 * jak bylo uvedeno v **<A>** a pozitivně zjištěno **<B>** v souladu s **osvědčením <C>**.
** jak bylo uvedeno v souboru technické konstrukce **<D>** a pozitivně zjištěno **<E>** (použitý modul **<F>**). **<G>**. Kategorie rizik **<H>**. Viz také následující strana.
15 * kako je izloženo u **<A>** i pozitivno ocijenjeno od strane **<B>** prema **Certifikatu <C>**.
** kako je izloženo u Datoteci o tehničkoj konstrukciji **<D>** i pozitivno ocijenjeno od strane **<E>** (Primijenjen modul **<F>**). **<G>**. Kategorija opasnosti **<H>**. Također pogledajte na slijedećoj stranici.
16 * a(z) **<A>** alapján, a(z) **<B>** igazolta a megfelelést, a(z) **<C>** **tanúsítvány** szerint.
** a(z) **<D>** műszaki konstrukciós dokumentáció alapján, a(z) **<E>** igazolta a megfelelést (alkalmazott modul: **<F>**). **<G>**. Veszélyességi kategória **<H>**. Lásd még a következő oldalon.
17 * zgodnie z dokumentacją **<A>**, pozytywną opinią **<B>** i **Świadectwem <C>**.
** zgodnie z archiwalną dokumentacją konstrukcyjną **<D>** i pozytywną opinią **<E>** (Zastosowany moduł **<F>**). **<G>**. Kategoria zagrożenia **<H>**. Patrz także następna strona.
18 * aşa cum este stabilit în **<A>** şi apreciat pozitiv de **<B>** în conformitate cu **Certificatul <C>**.
** conform celor stabilite în Dosarul tehnic de construcţie **<D>** şi apreciate pozitiv de **<E>** (Modul aplicat **<F>**). **<G>**. Categorie de risc **<H>**. Consultaţi de asemenea pagina următoare.
19 * kot je določeno v **<A>** in odobreno s strani **<B>** v skladu s **certifikatom <C>**.
** kot je določeno v tehnični mapi **<D>** in odobreno s strani **<E>** (Uporabljen modul **<F>**). **<G>**. Kategorija tveganja **<H>**. Glejte tudi na naslednji strani.
20 * nagu on näidatud dokumendis **<A>** ja heaks kiidetud **<B>** järgi vastavalt **sertifikaadile <C>**.
** nagu on näidatud tehnilises dokumentatsioonis **<D>** ja heaks kiidetud **<E>** järgi (lisamoodul **<F>**). **<G>**. Riskikategooria **<H>**. Vaadake ka järgmist lehekülge.
21 * както е изложено в **<A>** и оценено положително от **<B>** съгласно **Сертификата <C>**.
** както е заложено в Акта за техническа конструкция **<D>** и оценено положително от **<E>** (Приложен модул **<F>**). **<G>**. Категория риск **<H>**. Вижте също на следващата страница.
22 * kaip nustatyta **<A>** ir kaip teigiamai nuspręsta **<B>** pagal **Sertifikatą <C>**.
** kaip nurodyta Techninėje konstrukcijos byloje **<D>** ir patvirtinta **<E>** (taikomas modulis **<F>**). **<G>**. Rizikos kategorija **<H>**. Taip pat žiūrėkite ir kitą puslapį.
23 * kā norādīts **<A>** un atbilstoši **<B>** pozitīvajam vērtējumam saskaņā ar **sertifikātu <C>**.
** kā noteikts tehniskajā dokumentācijā **<D>**, atbilstoši **<E>** pozitīvajam lēmumam (piekritīgā sadaļa: **<F>**). **<G>**. Riska kategorija **<H>**. Skat. arī nākošo lappusi.
24 * ako bolo uvedené v **<A>** a pozitívne zistené **<B>** v súlade s **osvedčením <C>**.
** ako je to stanovené v Súbore technickej konštrukcie **<D>** a kladne posúdené **<E>** (Aplikovaný modul **<F>**). **<G>**. Kategória nebezpečia **<H>**. Viď tiež nasledovnú stranu.
25 * **<A>**'da belirtildiği gibi ve **<C>** **Sertifikasına** göre **<B>** tarafından olumlu olarak değerlendirildiği gibi.
** **<D>** Teknik Yapı Dosyasında belirtildiği gibi ve **<E>** tarafından olumlu olarak (Uygulanan modül **<F>**) değerlendirilmiştir. **<G>**. Risk kategorisi **<H>**. Ayrıca bir sonraki sayfaya bakın.

<A>	**DAIKIN.TCF.024D25/04-2010**
<B>	**TÜV (NB1856)**
<C>	**0510260101**
<D>	**Daikin.TCFP.001**
<E>	**AIB Vinçotte (NB0026)**
<F>	**D1**
<G>	**–**
<H>	**II**

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03 *** Daikin Europe N.V. est autorisé à compiler le Dossier de Construction Technique.
04 *** Daikin Europe N.V. is bevoegd om het Technisch Constructiedossier samen te stellen.
05 *** Daikin Europe N.V. está autorizado a compilar el Archivo de Construcción Técnica.
06 *** Daikin Europe N.V. è autorizzata a redigere il File Tecnico di Costruzione.
07 *** Η Daikin Europe N.V. είναι εξουσιοδοτημένη να συντάξει τον Τεχνικό φάκελο κατασκευής.
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15 *** Daikin Europe N.V. je ovlašten za izradu Datoteke o tehničkoj konstrukciji.
16 *** A Daikin Europe N.V. jogosult a műszaki konstrukciós dokumentáció összeállítására.
17 *** Daikin Europe N.V. ma upoważnienie do zbierania i opracowywania dokumentacji konstrukcyjnej.
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20 *** Daikin Europe N.V. on volitatud koostama tehnilist dokumentatsiooni.
21 *** Daikin Europe N.V. е оторизирана да състави Акта за техническа конструкция.
22 *** Daikin Europe N.V. yra įgaliota sudaryti šį techninės konstrukcijos failą.
23 *** Daikin Europe N.V. ir autorizēts sastādīt tehnisko dokumentāciju.
24 *** Spoločnosť Daikin Europe N.V. je oprávnená vytvoriť súbor technickej konštrukcie.
25 *** Daikin Europe N.V. Teknik Yapı Dosyasını derlemeye yetkilidir.

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25 (TR) önceki sayfadan devam

01 **Design Specifications of the models to which this declaration relates:**
02 **Konstruktionsdaten der Modelle auf die sich diese Erklärung bezieht:**
03 **Spécifications de conception des modèles auxquels se rapporte cette déclaration:**
04 **Ontwerpspecificaties van de modellen waarop deze verklaring betrekking heeft:**
05 **Especificaciones de diseño de los modelos a los cuales hace referencia esta declaración:**
06 **Specifiche di progetto dei modelli cui fa riferimento la presente dichiarazione:**
07 **Προδιαγραφές Σχεδιασμού των μοντέλων με τα οποία σχετίζεται η δήλωση:**
08 **Especificações de projecto dos modelos a que se aplica esta declaração:**
09 **Проектные характеристики моделей, к которым относится настоящее заявление:**
10 **Typespecifikationer for de modeller, som denne erklæring vedrører:**
11 **Designspecifikationer för de modeller som denna deklaration gäller:**
12 **Konstruksjonsspesifikasjoner for de modeller som berøres av denne deklarasjonen:**
13 **Tätä ilmoitusta koskevien mallien rakennemäärittely:**
14 **Specifikace designu modelů, ke kterým se vztahuje toto prohlášení:**
15 **Specifikacije dizajna za modele na koje se ova izjava odnosi:**
16 **A jelen nyilatkozat tárgyát képező modellek tervezési jellemzői:**
17 **Specyfikacje konstrukcyjne modeli, których dotyczy deklaracja:**
18 **Specificaţiile de proiectare ale modelelor la care se referă această declaraţie:**
19 **Specifikacije tehničnega načrta za modele, na katere se nanaša ta deklaracija:**
20 **Deklaratsiooni alla kuuluvate mudelite disainispetsifikatsioonid:**
21 **Проектни спецификации на моделите, за които се отнася декларацията:**
22 **Konstrukcinės specifikacijos modelių, kurie susiję su šia deklaracija:**
23 **To modeļu dizaina specifikācijas, uz kurām attiecas šī deklarācija:**
24 **Konštrukčné špecifikácie modelu, ktorého sa týka toto vyhlásenie:**
25 **Bu bildirinin ilgili olduğu modellerin Tasarım Özellikleri:**

01
- Maximum allowable pressure (PS): **<K>** (bar)
- Minimum/maximum allowable temperature (TS*):
  * TSmin: Minimum temperature at low pressure side: **<L>** (°C)
  * TSmax: Saturated temperature corresponding with the maximum allowable pressure (PS): **<M>** (°C)
- Refrigerant: **<N>**
- Setting of pressure safety device: **<P>** (bar)
- Manufacturing number and manufacturing year: refer to model nameplate

02
- Maximal zulässiger Druck (PS): **<K>** (Bar)
- Minimal/maximal zulässige Temperatur (TS*):
  * TSmin: Mindesttemperatur auf der Niederdruckseite: **<L>** (°C)
  * TSmax: Sättigungstemperatur die dem maximal zulässigen Druck (PS) entspricht: **<M>** (°C)
- Kältemittel: **<N>**
- Einstellung der Druck-Schutzvorrichtung: **<P>** (Bar)
- Herstellungsnummer und Herstellungsjahr: siehe Typenschild des Models

03
- Pression maximale admise (PS): **<K>** (bar)
- Température minimum/maximum admise (TS*):
  * TSmin: température minimum côté basse pression: **<L>** (°C)
  * TSmax: température saturée correspondant à la pression maximale admise: **<M>** (°C)
- Réfrigérant: **<N>**
- Réglage du dispositif de sécurité de pression: **<P>** (bar)
- Numéro de fabrication et année de fabrication: se reporter à la plaquette signalétique du modèle

04
- Maximaal toelaatbare druk (PS): **<K>** (bar)
- Minimaal/maximaal toelaatbare temperatuur (TS*):
  * TSmin: Minimumtemperatuur aan lagedrukzijde: **<L>** (°C)
  * TSmax: Verzadigde temperatuur die overeenstemt met de maximaal toelaatbare druk (PS): **<M>** (°C)
- Koelmiddel: **<N>**
- Instelling van drukbeveiliging: **<P>** (bar)
- Fabricagenummer en fabricagejaar: zie naamplaat model

05
- Presión máxima admisible (PS): **<K>** (bar)
- Temperatura mínima/máxima admisible (TS*):
  * TSmin: Temperatura mínima en el lado de baja presión: **<L>** (°C)
  * TSmax: Temperatura saturada correspondiente a la presión máxima admisible: **<M>** (°C)
- Refrigerante: **<N>**
- Ajuste del presostato de seguridad: **<P>** (bar)
- Número de fabricación y año de fabricación: consulte la placa de especificaciones técnicas del modelo

06
- Pressione massima consentita (PS): **<K>** (bar)
- Temperatura minima/massima consentita (TS*):
  * TSmin: temperatura minima nel lato di bassa pressione: **<L>** (°C)
  * TSmax: temperatura satura corrispondente alla pressione massima consentita (PS): **<M>** (°C)
- Refrigerante: **<N>**
- Impostazione del dispositivo di controllo della pressione: **<P>** (bar)
- Numero di serie e anno di produzione: fare riferimento alla targhetta del modello

07
- Μέγιστη επιτρεπόμενη πίεση (PS): **<K>** (bar)
- Ελάχιστη/μέγιστη επιτρεπόμενη θερμοκρασία (TS*):
  * TSmin: Ελάχιστη θερμοκρασία για την πλευρά χαμηλής πίεσης: **<L>** (°C)
  * TSmax: Κορεσμένη θερμοκρασία που αντιστοιχεί με τη μέγιστη επιτρεπόμενη πίεση (PS): **<M>** (°C)
- Ψυκτικό: **<N>**
- Ρύθμιση της διάταξης ασφάλειας πίεσης: **<P>** (bar)
- Αριθμός κατασκευής και έτος κατασκευής: ανατρέξτε στην πινακίδα αναγνώρισης του μοντέλου

08
- Pressão máxima permitida (PS): **<K>** (bar)
- Temperaturas mínima e máxima permitidas (TS*):
  * TSmin: Temperatura mínima em baixa pressão: **<L>** (°C)
  * TSmax: Temperatura de saturação correspondente à pressão máxima permitida (PS): **<M>** (°C)
- Refrigerante: **<N>**
- Regulação do dispositivo de segurança da pressão: **<P>** (bar)
- Número e ano de fabrico: consultar a placa de especificações da unidade

09
- Максимально допустимое давление (PS): **<K>** (бар)
- Минимально/максимально допустимая температура (TS*):
  * TSmin: Минимальная температура на стороне низкого давления: **<L>** (°C)
  * TSmax: Температура кипения, соответствующая максимально допустимому давлению (PS): **<M>** (°C)
- Хладагент: **<N>**
- Настройка устройства защиты по давлению: **<P>** (бар)
- Заводской номер и год изготовления: смотрите паспортную табличку модели

10
- Maks. tilladt tryk (PS): **<K>** (bar)
- Min./maks. tilladte temperatur (TS*):
  * TSmin: Min. temperatur på lavtrykssiden: **<L>** (°C)
  * TSmax: Mættet temperatur svarende til maks. tilladte tryk (PS): **<M>** (°C)
- Kølemiddel: **<N>**
- Indstilling af tryksikringsudstyr: **<P>** (bar)
- Produktionsnummer og fremstillingsår: se modellens fabriksskilt

11
- Maximalt tillåtet tryck (PS): **<K>** (bar)
- Min/max tillåten temperatur (TS*):
  * TSmin: Minimumtemperatur på lågtryckssidan: **<L>** (°C)
  * TSmax: Mättnadstemperatur som motsvarar maximalt tillåtet tryck (PS): **<M>** (°C)
- Köldmedel: **<N>**
- Inställning för trycksäkerhetsenhet: **<P>** (bar)
- Tillverkningsnummer och tillverkningsår: se modellens namnplåt

12
- Maksimalt tillatt trykk (PS): **<K>** (bar)
- Minimalt/maksimalt tillatt temperatur (TS*):
  * TSmin: Minimumstemperatur på lavtrykkssiden: **<L>** (°C)
  * TSmax: Metningstemperatur i samsvar med maksimalt tillatt trykk (PS): **<M>** (°C)
- Kjølemedium: **<N>**
- Innstilling av sikkerhetsanordning for trykk: **<P>** (bar)
- Produksjonsnummer og produksjonsår: se modellens merkeplate

13
- Suurin sallittu paine (PS): **<K>** (bar)
- Pienin/suurin sallittu lämpötila (TS*):
  * TSmin: Alhaisin matalapainepuolen lämpötila: **<L>** (°C)
  * TSmax: Suurinta sallittua painetta (PS) vastaava kyllästyslämpötila: **<M>** (°C)
- Kylmäaine: **<N>**
- Varmuuspainelaitteen asetus: **<P>** (bar)
- Valmistusnumero ja valmistusvuosi: katso mallin nimikilpi

14
- Maximální přípustný tlak (PS): **<K>** (bar)
- Minimální/maximální přípustná teplota (TS*):
  * TSmin: Minimální teplota na nízkotlaké straně: **<L>** (°C)
  * TSmax: Saturovaná teplota odpovídající maximálnímu přípustnému tlaku (PS): **<M>** (°C)
- Chladivo: **<N>**
- Nastavení bezpečnostního tlakového zařízení: **<P>** (bar)
- Výrobní číslo a rok výroby: viz typový štítek modelu

15
- Najveći dopušten tlak (PS): **<K>** (bar)
- Najniža/najviša dopuštena temperatura (TS*):
  * TSmin: Najniža temperatura u području niskog tlaka: **<L>** (°C)
  * TSmax: Standardna temperatura koja odgovara najvećem dopuštenom tlaku (PS): **<M>** (°C)
- Rashladno sredstvo: **<N>**
- Postavke sigurnosne naprave za tlak: **<P>** (bar)
- Proizvodni broj i godina proizvodnje: pogledajte natpisnu pločicu modela

16
- Legnagyobb megengedhető nyomás (PS): **<K>** (bar)
- Legkisebb/legnagyobb megengedhető hőmérséklet (TS*):
  * TSmin: Legkisebb megengedhető hőmérséklet a kis nyomású oldalon: **<L>** (°C)
  * TSmax: A legnagyobb megengedhető nyomásnak (PS) megfelelő telítettségi hőmérséklet (PS): **<M>** (°C)
- Hűtőközeg: **<N>**
- A túlnyomás-kapcsoló beállítása: **<P>** (bar)
- Gyártási szám és gyártási év: lásd a berendezés adattábláján

17
- Maksymalne dopuszczalne ciśnienie (PS): **<K>** (bar)
- Minimalna/maksymalna dopuszczalna temperatura (TS*):
  * TSmin: Minimalna temperatura po stronie niskociśnieniowej: **<L>** (°C)
  * TSmax: Temperatura nasycenia odpowiadająca maksymalnemu dopuszczalnemu ciśnieniu (PS): **<M>** (°C)
- Czynnik chłodniczy: **<N>**
- Nastawa ciśnieniowego urządzenia bezpieczeństwa: **<P>** (bar)
- Numer fabryczny oraz rok produkcji: patrz tabliczka znamionowa modelu

18
- Presiune maximă admisibilă (PS): **<K>** (bar)
- Temperatură minimă/maximă admisibilă (TS*):
  * TSmin: Temperatură minimă pe partea de presiune joasă: **<L>** (°C)
  * TSmax: Temperatura de saturaţie corespunzând presiunii maxime admisibile (PS): **<M>** (°C)
- Agent frigorific: **<N>**
- Reglarea dispozitivului de siguranţă pentru presiune: **<P>** (bar)
- Numărul de fabricaţie şi anul de fabricaţie: consultaţi placa de identificare a modelului

19
- Maksimalni dovoljeni tlak (PS): **<K>** (bar)
- Minimalna/maksimalna dovoljena temperatura (TS*):
  * TSmin: Minimalna temperatura na nizkotlačni strani: **<L>** (°C)
  * TSmax: Nasičena temperatura, ki ustreza maksimalnemu dovoljenemu tlaku (PS): **<M>** (°C)
- Hladivo: **<N>**
- Nastavljanje varnostne naprave za tlak: **<P>** (bar)
- Tovarniška številka in leto proizvodnje: glejte napisno ploščico

20
- Maksimaalne lubatud surve (PS): **<K>** (bar)
- Minimaalne/maksimaalne lubatud temperatuur (TS*):
  * TSmin: Minimaalne temperatuur madalsurve küljel: **<L>** (°C)
  * TSmax: Maksimaalsele lubatud survele (PS) vastav küllastunud temperatuur (PS): **<M>** (°C)
- Jahutusaine: **<N>**
- Surve turvaseadme seadistus: **<P>** (bar)
- Tootmisnumber ja tootmisaasta: vaadake mudeli andmeplaati

21
- Максимално допустимо налягане (PS): **<K>** (bar)
- Минимално/максимално допустима температура (TS*):
  * TSmin: Минимална температура от страната на ниското налягане: **<L>** (°C)
  * TSmax: Температура на насищане, съответстваща на максимално допустимото налягане (PS): **<M>** (°C)
- Охладител: **<N>**
- Настройка на предпазното устройство за налягане: **<P>** (bar)
- Фабричен номер и година на производство: вижте табелката на модела

22
- Maksimalus leistinas slėgis (PS): **<K>** (bar)
- Minimali/maksimali leistina temperatūra (TS*):
  * TSmin: Minimali temperatūra žemo slėgio pusėje: **<L>** (°C)
  * TSmax: Prisotinta temperatūra, atitinkamti maksimalų leistiną slėgį (PS): **<M>** (°C)
- Šaldymo skystis: **<N>**
- Apsauginio slėgio prietaiso nustatymas: **<P>** (bar)
- Gaminio numeris ir pagaminimo metai: žiūrėkite modelio pavadinimo plokštelę

23
- Maksimālais pieļaujamais spiediens (PS): **<K>** (bar)
- Minimālā/maksimālā pieļaujamā temperatūra (TS*):
  * TSmin: Minimālā temperatūra zemā spiediena pusē: **<L>** (°C)
  * TSmax: Piesātinātā temperatūra saskaņā ar maksimālo pieļaujamo spiedienu (PS): **<M>** (°C)
- Dzesinātājs: **<N>**
- Spiediena drošības ierīces iestatīšana: **<P>** (bar)
- Izgatavošanas numurs un izgatavošanas gads: skat. modeļa izgatavotājuzņēmuma plāksnītie

24
- Maximálny povolený tlak (PS): **<K>** (bar)
- Minimálna/maximálna povolená teplota (TS*):
  * TSmin: Minimálna teplota na nízkotlakovej strane: **<L>** (°C)
  * TSmax: Nasýtená teplota korešpondujúca s maximálnym povoleným tlakom (PS): **<M>** (°C)
- Chladivo: **<N>**
- Nastavenie tlakového poistného zariadenia: **<P>** (bar)
- Výrobné číslo a rok výroby: nájdete na výrobnom štítku modelu

25
- İzin verilen maksimum basınç (PS): **<K>** (bar)
- İzin verilen minimum/maksimum sıcaklık (TS*):
  * TSmin: Düşük basınç tarafındaki minimum sıcaklık: **<L>** (°C)
  * TSmax: İzin verilen maksimum basınca (PS) karşı gelen doyma sıcaklığı (PS): **<M>** (°C)
- Soğutucu: **<N>**
- Basınç emniyet düzeninin ayarı: **<P>** (bar)
- İmalat numarası ve imalat yılı: modelin ünite plakasına bakın

<K>	PS	**40**	**bar**
<L>	TSmin	**–30**	**°C**
<M>	TSmax	**63**	**°C**
<N>		**R410A**	
<P>		**40**	**bar**

01 Name and address of the Notified body that judged positively on compliance with the Pressure Equipment Directive: **<Q>**
02 Name und Adresse der benannten Stelle, die positiv unter Einhaltung der Druckanlagen-Richtlinie urteilte: **<Q>**
03 Nom et adresse de l'organisme notifié qui a évalué positivement la conformité à la directive sur l'équipement de pression: **<Q>**
04 Naam en adres van de aangemelde instantie die positief geoordeeld heeft over de conformiteit met de Richtlijn Drukapparatuur: **<Q>**
05 Nombre y dirección del Organismo Notificado que juzgó positivamente el cumplimiento con la Directiva en materia de Equipos de Presión: **<Q>**
06 Nome e indirizzo dell'Ente riconosciuto che ha riscontrato la conformità alla Direttiva sulle apparecchiature a pressione: **<Q>**
07 Ονομα και διεύθυνση του Κοινοποιημένου οργανισμού που απεφάνθη θετικά για τη συμμόρφωση προς την Οδηγία Εξοπλισμών υπό Πίεση: **<Q>**
08 Nome e morada do organismo notificado, que avaliou favoravelmente a conformidade com a directiva sobre equipamentos pressurizados: **<Q>**
09 Название и адрес органа технической экспертизы, принявшего положительное решение о соответствии Директиве об оборудовании под давлением: **<Q>**
10 Navn og adresse på bemyndiget organ, der har foretaget en positiv bedømmelse af, at udstyret lever op til kravene i PED (Direktiv for Trykbærende Udstyr): **<Q>**
11 Namn och adress för det anmälda organ som godkänt uppfyllandet av tryckutrustningsdirektivet: **<Q>**
12 Navn på og adresse til det autoriserte organet som positivt bedømte samsvar med direktivet for trykkutstyr (Pressure Equipment Directive): **<Q>**
13 Sen ilmoitetun elimen nimi ja osoite, joka teki myönteisen päätöksen painelaitedirektiivin noudattamisesta: **<Q>**
14 Název a adresa informovaného orgánu, který vydal pozitivní posouzení shody se směrnicí o tlakových zařízeních: **<Q>**
15 Naziv i adresa prijavljenog tijela koje je donijelo pozitivnu prosudbu o usklađenosti sa Smjernicom za tlačnu opremu: **<Q>**
16 A nyomástartó berendezésekre vonatkozó irányelvnek való megfelelŒséget igazoló bejelentett szervezet neve és címe: **<Q>**
17 Nazwa i adres Jednostki notyfikowanej, która wydała pozytywną opinię dotyczącą spełnienia wymogów Dyrektywy dot. Urządzeń Ciśnieniowych: **<Q>**
18 Denumirea şi adresa organismului notificat care a apreciat pozitiv conformarea cu Directiva privind echipamentele sub presiune: **<Q>**
19 Ime in naslov organa za ugotavljanje skladnosti, ki je pozitivno ocenil združljivost z Direktivo o tlačni opremi: **<Q>**
20 Teavitatud organi, mis hindas Surveseadmete Direktiiviga ühilduvust positiivselt, nimi ja aadress: **<Q>**
21 Наименование и адрес на упълномощения орган, който се е произнесъл положително относно съвместимостта с Директивата за оборудване под налягане: **<Q>**
22 Atsakingos institucijos, kuri davė teigiamą sprendimą pagal slėginės įrangos direktyvą pavadinimas ir adresas: **<Q>**
23 Sertifikācijas institūcijas, kura ir devusi pozitīvu slēdzienu par atbilstību Spiediena Iekārtu Direktīvai, nosaukums un adrese: **<Q>**
24 Názov a adresa certifikačného úradu, ktorý kladne posúdil zhodu so smernicou pre tlakové zariadenia: **<Q>**
25 Basınçlı Teçhizat Direktifine uygunluk hususunda olumlu olarak değerlendirilen Onaylanmış kuruluşun adı ve adresi: **<Q>**

<Q> AIB VINÇOTTE INTERNATIONAL
Avenue du Roi 157
B-1190 Brussels, Belgium

2PW40200-11P

DAIKIN

Jean-Pierre Beuselinck
Director
Ostend, 2nd of November 2011

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

CONTENTS

Thank you for purchasing this product.

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

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

1. Definitions

Installation manual:

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

Danger:

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

Warning:

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

Caution:

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

Note:

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

Dealer:

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

Installer:

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

Service agent:

Qualified person who can perform or coordinate the required service to the unit.

Legislation:

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

Accessories:

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

Optional equipment:

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

Field supply:

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

2. General Safety precautions

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

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

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

Improper installation or attachment of equipment or accessories could result in electric shock, short-circuit, leaks, fire or other damage to the equipment. Be sure only to use accessories and optional equipment made by Daikin which are specially designed for use with the products as of subject in this manual and have them installed by an installer.

DANGER: ELECTRICAL SHOCK

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

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

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

DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS

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

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

3. Introduction

3.1. General information

This installation manual concerns Daikin Altherma air to water inverter heat pump units of the Daikin EMRQ series.

These units are intended for outdoor installation and aimed for apartment or other multi user buildings.

The unit is mainly designed for heating operation. If heat pump type indoor units are connected, cooling and heat recovery operation is also possible.

These units have heating capacities ranging from 22.4 to 45 kW and cooling capacities rating from 20 to 40 kW.

The outdoor unit is designed to work in heating mode at ambient temperatures from –20°C to 20°C and in cooling mode at ambient temperatures from 10°C to 43°C.

NOTE Design of the system must not be done at temperatures below –15°C.

3.2. Combination and options

The EMRQ outdoor units can only be combined with EKHVMRD, EKHVMYD or EKHBRD(1) indoor units.

To install the outdoor unit, the following optional parts are also required.

■ The refrigerant branching kit:

Description	Model name
refnet header	KHRQ23M29H
	KHRQ23M64H
	KHRQ22M29H
	KHRQ22M64H
refnet joint	KHRQ23M20T
	KHRQ23M29T
	KHRQ23M64T
	KHRQ22M20T
	KHRQ22M29T
	KHRQ22M64T

For the selection of the optimal branching kit, please refer to "9.3. Selection of refrigerant branch kits" on page 12.

To collect centrally the drain water from the bottom plate, following option can be connected:

Description	Model name
Central drain pan kit	KWC25C450

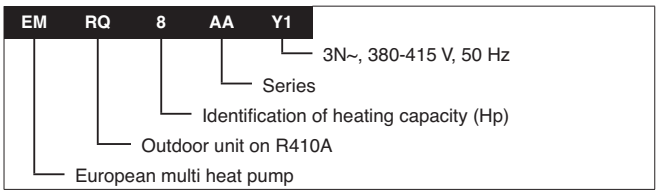
When there is a risk for freeze-up of this drain pan, the installer should take enough measures to avoid ice accumulation.

3.3. Scope of the manual

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

NOTE The installation of the EKHVMRD, EKHVMYD or EKHBRD indoor unit(s) is described in the indoor unit installation manual.

3.4. Model identification

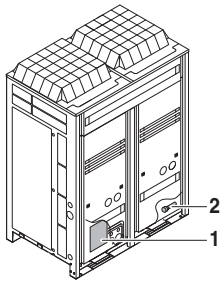


4. Accessories

4.1. Accessories supplied with this unit

■ See location 1 in the figure below for reference to where following accessories are supplied with the unit.

Installation manual	1x
Additional refrigerant charge label	1x
Installation information sticker	1x
Fluorinated greenhouse gases label	1x
Multilingual fluorinated greenhouse gases label	1x



■ See location 2 in the figure above for reference to where following accessories are supplied with the unit.

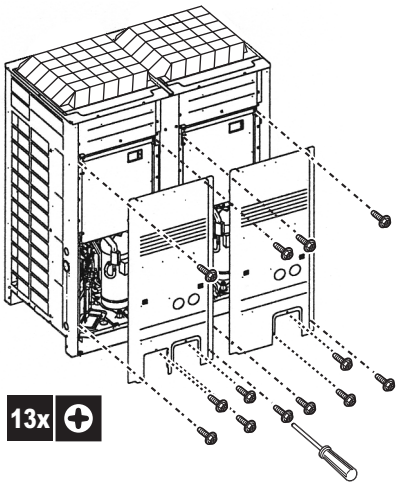
		EMRQ				
		8	10	12	14	16
Liquid accessory pipe (1)		1x	1x	1x	1x	1x
Liquid accessory pipe (2)		1x	1x	1x	1x	1x
Suction gas accessory pipe (1)	Ø22.2	1x	—	—	—	—
	Ø22.2	—	1x	—	—	—
	Ø28.6	—	—	1x	1x	1x
Suction gas accessory pipe (2)	Ø19.1	1x	—	—	—	—
	Ø22.2	—	1x	—	—	—
	Ø28.6	—	—	1x	1x	1x
Discharge accessory pipe (1)	Ø15.9	1x	—	—	—	—
	Ø19.1	—	1x	1x	—	—
	Ø19.1	—	—	—	1x	1x
Discharge accessory pipe (2)	Ø15.9	1x	—	—	—	—
	Ø19.1		1x	1x	—	—
	Ø22.2	—	—	—	1x	1x
Accessory joint (angle of 90°) (1)	Ø25.4	1x	1x	1x	1x	1x
Accessory joint (angle of 90°) (2)	Ø19.1	1x	1x	1x	1x	1x
Accessory joint		1x	—	—	—	—

(1) EKHBRD connection is possible for EKHBRD_ABX and EKHBRD_AC. Connection is NOT possible for EKHBRD_AA or EKHBRD_AB models. For more details, see technical data book.

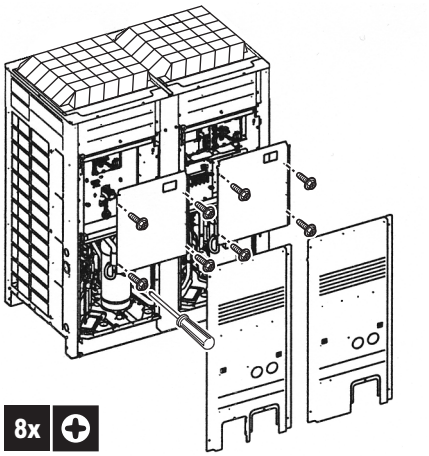
5. Overview of unit

5.1. Opening the unit

To gain access to the unit, front plates need to be opened as follows:



Once the front plates open, the electrical component box can be accessed by removing the electrical component box cover as follows:



For service purposes, the push buttons on the switch box PCB need to be accessed. To access these push buttons, the electrical component box cover does not need to be opened. See "Field settings by push buttons" on page 27.

DANGER: ELECTRICAL SHOCK

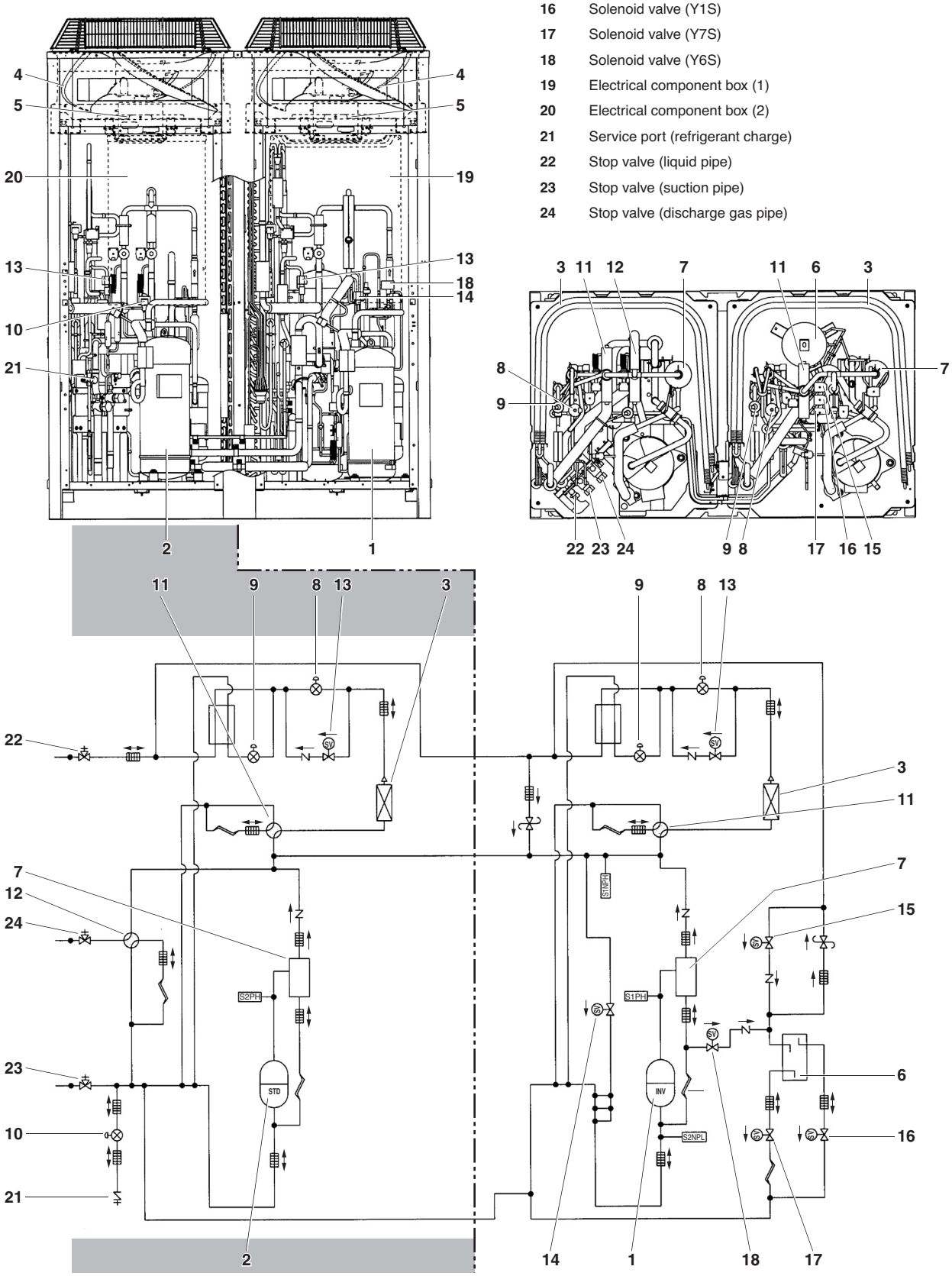
See "2. General Safety precautions" on page 2.

DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS

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

5.2. Main components in the unit

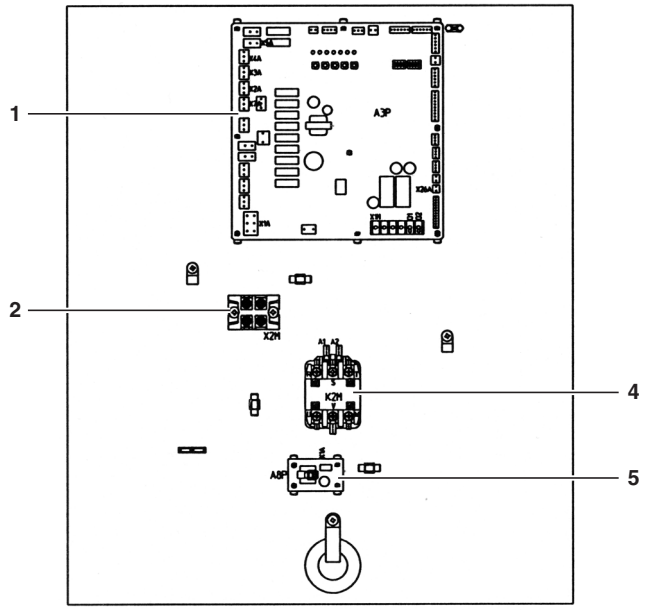
1	Compressor (Inverter (INV))
2	Compressor (Standard (STD), Inverter for EMRQ14+16)
3	Heat exchanger
4	Fan
5	Fan motor (M1F, M2F)
6	Refrigerant regulator
7	Oil separator
8	Electronic expansion valve (main)(Y1E, Y3E)
9	Electronic expansion valve (subcooling)(Y2E, Y5E)
10	Electronic expansion valve (charge)(Y4E)
11	4-way valve (heat exchanger)(Y2S, Y9S)
12	4-way valve (pipe)(Y8S)
13	Solenoid valve (expansion valve bypass)(Y5S)
14	Solenoid valve (hot gas)(Y4S)
15	Solenoid valve (Y3S)
16	Solenoid valve (Y1S)
17	Solenoid valve (Y7S)
18	Solenoid valve (Y6S)
19	Electrical component box (1)
20	Electrical component box (2)
21	Service port (refrigerant charge)
22	Stop valve (liquid pipe)
23	Stop valve (suction pipe)
24	Stop valve (discharge gas pipe)



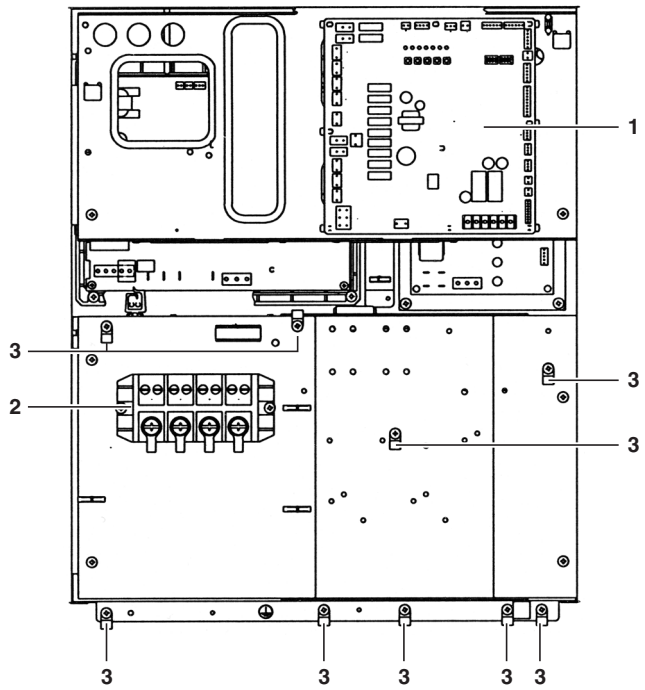
5.3. Main components in the switch box

Electrical component box (left switch box)

For EMRQ8~12 only



For EMRQ14+16 only



1 Sub 2 PCB

2 Terminal block X2M

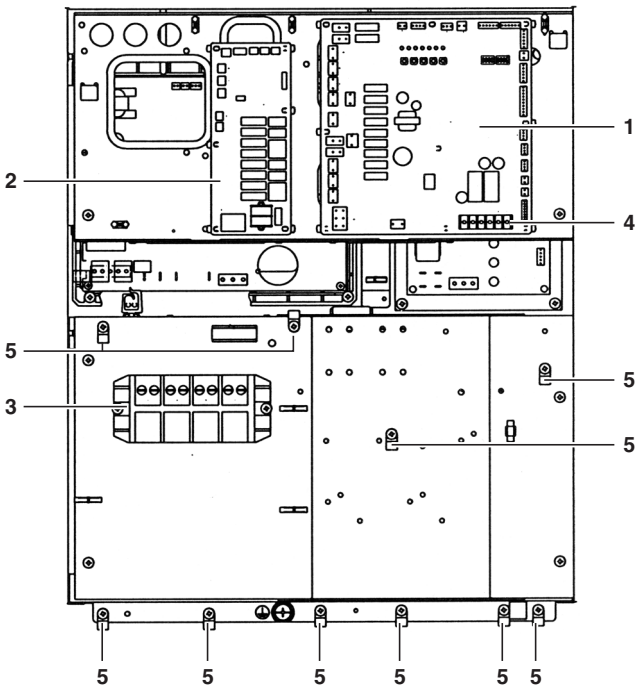
3 Cable tie mountings.
The cable tie mountings allow to fix the field wiring with cable ties to the switch box to ensure strain relief.

4 Magnetic contactor K2M

5 Current sensor PCB

Electrical component box (right switch box)

For all models



1 Main PCB

2 Sub 1 PCB

3 Terminal block X1M
Main terminal block which allows easy connection of field wiring for power supply.

4 X1M on main PCB. Terminal block for transmission wiring.

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

6. Selecting an installation location

WARNING

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

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

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

CAUTION

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

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

General precautions on installation location

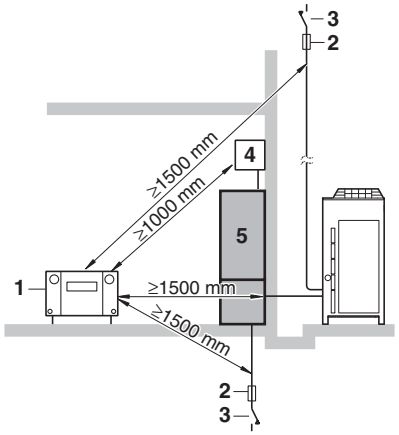
Select an installation site that meets the following requirements:

- The foundation must be strong enough to support the weight of the unit. The floor is flat to prevent vibrations and noise generation and to have sufficient stability.
- The space around the unit is adequate for maintenance and servicing (refer to "7.2. Service space" on page 9).
- The space around the unit allows for sufficient air circulation.
- There is no danger of fire due to leakage of inflammable gas.
- The equipment is not intended for use in a potentially explosive atmosphere.
- Select the location of the unit in such a way that the sound generated by the unit does not disturb anyone, and the location is selected according the applicable legislation.
- All piping lengths and distances have been taken into consideration (refer to "9.4. System piping limitations" on page 12).
- Take care that in the event of a water leak, water cannot cause any damage to the installation space and surroundings.
- When installing the unit in a small room, take measures in order to keep the refrigerant concentration from exceeding allowable safety limits in the event of a refrigerant leak.

  Excessive refrigerant concentrations in a closed room can lead to oxygen deficiency.

NOTE

- The equipment described in this manual may cause electronic noise generated from radio-frequency energy. The equipment complies to specifications that are designed to provide reasonable protection against such interference. However, there is no guarantee that interference will not occur in a particular installation.
  It is therefore recommended to install the equipment and electric wires keeping proper distances away from stereo equipment, personal computers, etc....



1	Personal computer or radio
2	Fuse
3	Earth leakage protector
4	Remote controller
5	Indoor unit

  In places with weak reception, keep distances of 3 m or more to avoid electromagnetic disturbance of other equipment and use conduit tubes for power and transmission lines.
- The refrigerant R410A itself is nontoxic, nonflammable and is safe. If the refrigerant should leak however, its concentration may exceed the allowable limit depending on room size. Due to this, it could be necessary to take measures against leakage. Refer to "17. Caution for refrigerant leaks" on page 30.
- Do not install in the following locations.
  - Locations where sulphurous acids and other corrosive gases may be present in the atmosphere.
    Copper piping and soldered joints may corrode, causing refrigerant to leak.
  - Locations where a mineral oil mist, spray or vapour may be present in the atmosphere.
    Plastic parts may deteriorate and fall off or cause water leakage.
  - Locations where equipment that produces electromagnetic waves is found.
    The electromagnetic waves may cause the control system to malfunction, preventing normal operation.
  - Locations where flammable gases may leak, where thinner, gasoline and other volatile substances are handled, or where carbon dust and other incendiary substances are found in the atmosphere.
    Leaked gas may accumulate around the unit, causing an explosion.
- When installing, take strong winds, typhoons or earthquakes into account.
  Improper installation may result in the unit turning over.

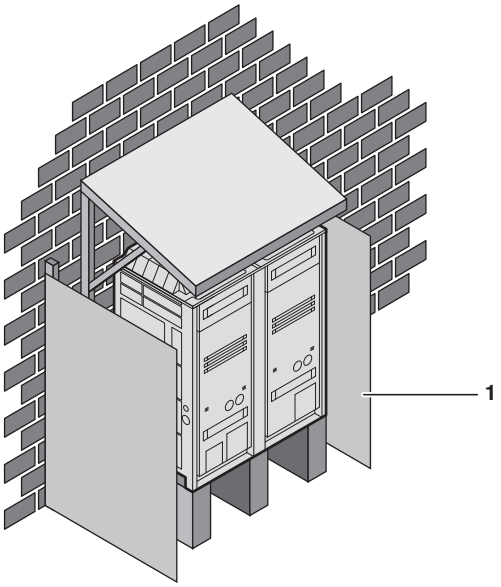
Weather dependent precautions

- Select a place where the rain can be avoided as much as possible.
- Be sure that the air inlet of the unit is not positioned towards the main wind direction. Frontal wind will disturb the operation of the unit. If necessary, use a screen to block the wind.
- Ensure that water cannot cause any damage to the location by adding water drains to the foundation and prevent water traps in the construction.
- Do not install the unit in areas where the air contains high levels of salt such as that near the ocean.

Selecting a location in cold climates

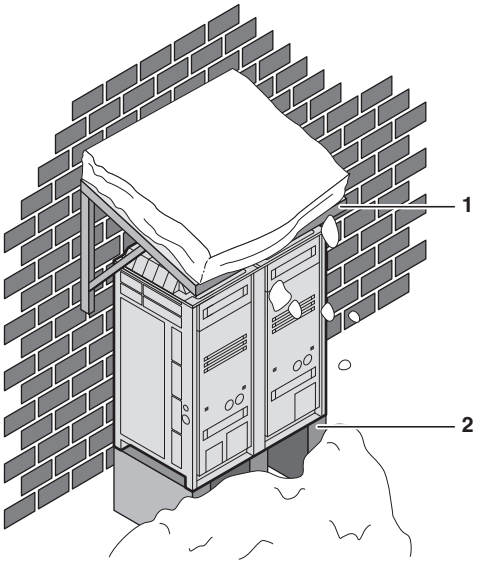
NOTE When operating the unit in a low outdoor ambient temperature, be sure to follow the instructions described below.

- To prevent exposure to wind and snow, install a baffle plate on the air side of the outdoor unit:



1 Baffle plate

- In heavy snowfall areas it is very important to select an installation site where the snow will not affect the unit. If lateral snowfall is possible, make sure that the heat exchanger coil is not affected by the snow (if necessary construct a lateral canopy).

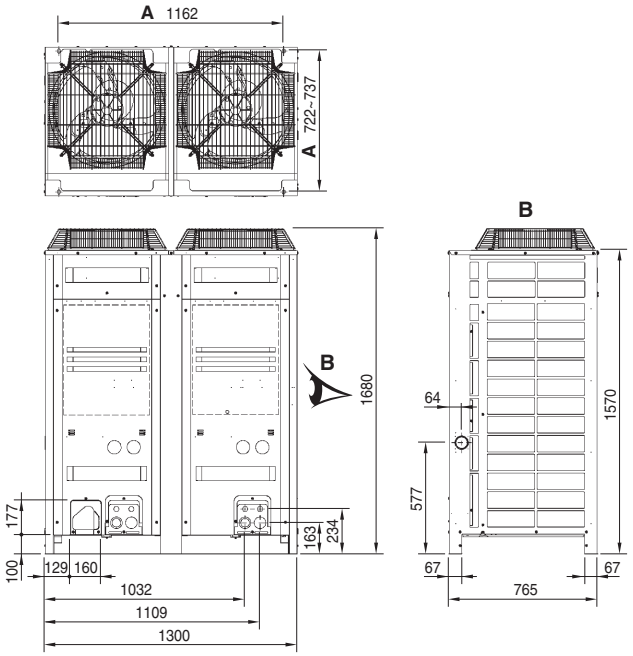


1 Construct a large canopy.

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

7. Dimensions and service space

7.1. Dimensions of outdoor unit

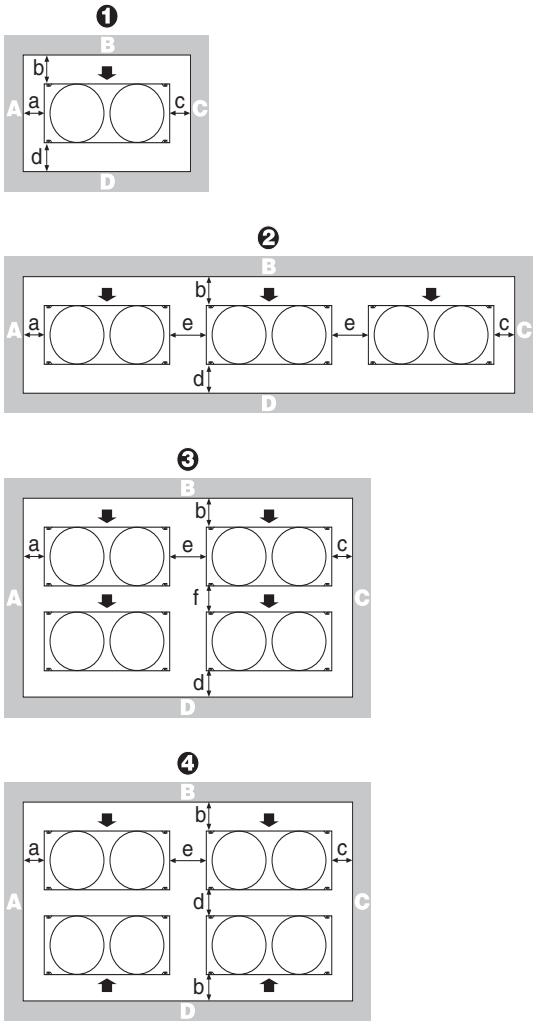


(distances shown are in mm)

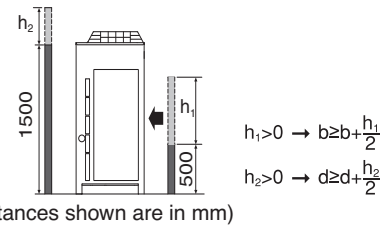
1 Pitch of foundation bolt holes
(15x22.5 oblong holes)

7.2. Service space

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



	A+B+C+D		A+B
❶	a ≥10 mm b ≥300 mm c ≥10 mm d ≥500 mm	a ≥50 mm b ≥100 mm c ≥50 mm d ≥500 mm	a ≥200 mm b ≥300 mm
❷	a ≥10 mm b ≥300 mm c ≥10 mm d ≥500 mm e ≥20 mm	a ≥50 mm b ≥100 mm c ≥50 mm d ≥500 mm e ≥100 mm	a ≥200 mm b ≥300 mm e ≥400 mm
❸	a ≥10 mm b ≥300 mm c ≥10 mm d ≥500 mm e ≥20 mm f ≥600 mm	a ≥50 mm b ≥100 mm c ≥50 mm d ≥500 mm e ≥100 mm f ≥500 mm	
❹	a ≥10 mm b ≥300 mm c ≥10 mm d ≥500 mm e ≥20 mm	a ≥50 mm b ≥100 mm c ≥50 mm d ≥500 mm e ≥100 mm	



(distances shown are in mm)

A B C D Sides along the installation site with obstacles

Suction side

- In case of an installation site where sides **A+B+C+D** have obstacles, the wall heights of sides **A+C** have no impact on service space dimensions. Refer to the figure above for impact of wall heights of sides **B+D** on service space dimensions.
- In case of an installation site where only the sides **A+B** have obstacles, the wall heights have no influence on any indicated service space dimensions.
- The installation space required on these drawings are for full load heating operation without considering possible ice accumulation.
  If the location of the installation is in a cold climate, then all dimensions above should be >500 mm to avoid accumulation of ice in between the outdoor units.

8. INSPECTING, HANDLING AND UNPACKING THE UNIT

8.1. Inspection

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

8.2. Handling

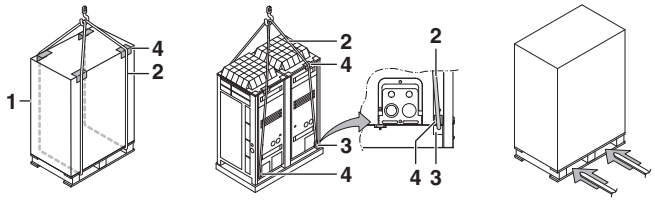
When handling the unit, take into account the following:

1 Fragile, handle the unit with care.

Keep the unit upright in order to avoid compressor damage.

2 Choose on beforehand the path along which the unit is to be brought in.

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



1 Packaging material
2 Belt sling
3 Opening
4 Protector

4 Lift the unit preferably with a crane and 2 belts of at least 8 m long as shown in the figure above.

Always use protectors to prevent belt damage and pay attention to the position of the unit's centre of gravity.

NOTE Use a belt sling of ≤20 mm wide that adequately bears the weight of the unit.

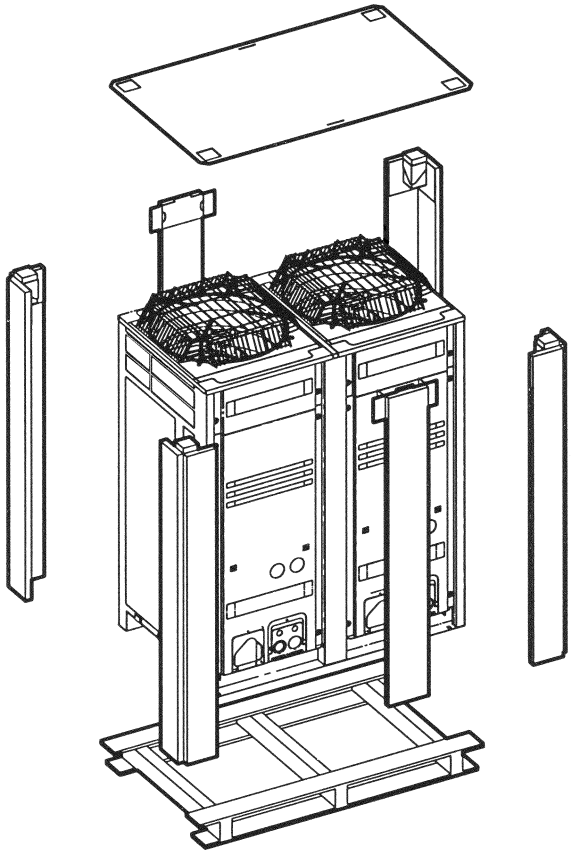
A forklift can only be used for transport as long as the unit remains on its pallet as shown above.

8.3. Unpacking

CAUTION

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

- Relief the unit from its packing material:



Take care not to damage the unit when removing the shrink foil with a cutter.

WARNING

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

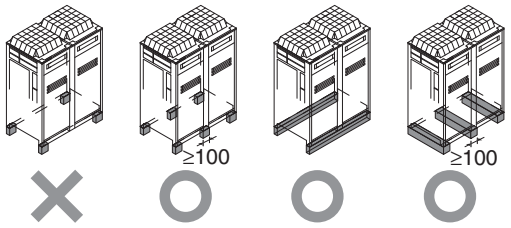
- Remove the 4 bolts fixing the unit to its pallet.
- Make sure that all accessories as mentioned in "4.1. Accessories supplied with this unit" on page 3 are available in the unit.

8.4. Installing the unit

- Make sure the unit is installed level on a sufficiently strong base to prevent vibration and noise.

NOTE

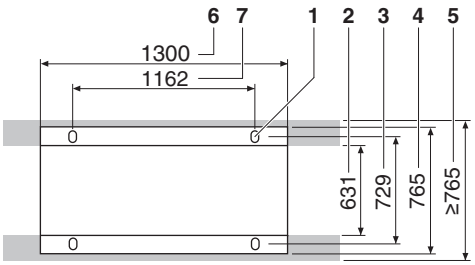
When the installation height of the unit needs to be increased, do not use stands to only support the corners:



X Not allowed

O Allowed (units: mm)

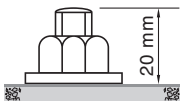
- The height of the foundation must at least be 150 mm from the floor.
  In heavy snowfall areas, this height should be increased dependant on the installation place and condition.
- The unit must be installed on a solid longitudinal foundation (steelbeam frame or concrete) and make sure the base under the unit is larger than the grey marked area:



(distances shown are in mm)

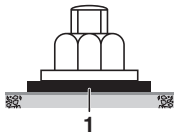
1	Hole for foundation bolt
2	Inner dimension of the base
3	Distance between foundation bolt holes
4	Depth of unit
5	Outher dimension of the base
6	Longitudinal foundation dimension
7	Distance between foundation bolt holes

- Fasten the unit in place using four foundation bolts M12. It is best to screw in the foundation bolts until their length remains 20 mm above the foundation surface.



NOTE

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



9. Refrigerant pipe size and allowable pipe length

9.1. Selection of piping material

NOTE

Piping and other pressure containing parts shall comply with the applicable legislation and shall be suitable for refrigerant. Use phosphoric acid deoxidised seamless copper for refrigerant.

- Foreign materials inside pipes (including oils for fabrication) must be ≤30 mg/10 m.
- Temper grade: use piping with temper grade in function of the pipe diameter as listed in table below.

Pipe Ø	Temper grade of piping material
≤15.9	O
≥19.1	1/2H

O = Annealed
1/2H = Half hard

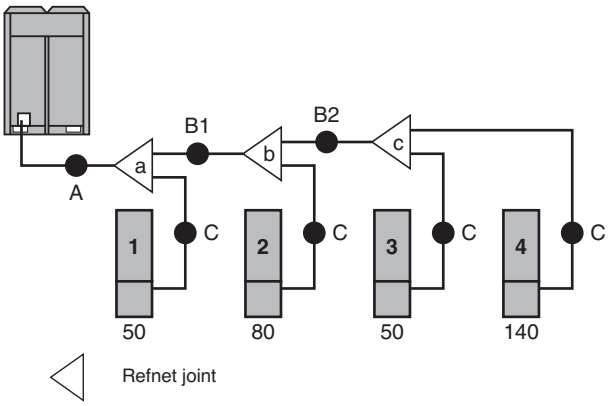
9.2. Selection of piping size

NOTE

- Reversible indoor units (EKHVMYD) need 3 pipes.
- Heating only indoor units (EKHVMRD or EKHBRD) need 2 pipes (liquid and discharge only).

Indoor units capacity index	
EKHBRD011	100
EKHBRD014	125
EKHBRD016	140
EKHVM(R/Y)D50	50
EKHVM(R/Y)D80	80

- Size: determine the proper size referring to following table:



A. Piping between outdoor unit and first branch pipe

Outdoor unit capacity type (Hp)	Piping outer diameter size (mm)		
	Suction gas pipe	Discharge gas pipe	Liquid pipe
8	19.1	15.9	9.5
10	22.2	19.1	9.5
12	28.6	19.1	12.7
14+16	28.6	22.2	12.7

NOTE

Never increase suction gas pipe and discharge gas pipe sizes.

B. Piping between refrigerant branch kits

Choose from the following table in accordance with the indoor unit total capacity type, connected downstream:

Indoor unit capacity index	Piping outer diameter size (mm)		
	Suction gas pipe	Discharge gas pipe	Liquid pipe
<150	15.9	12.7	9.5
150≤x<200	19.1	15.9	9.5
200≤x<290	22.2	19.1	9.5
290≤x<420	28.6	19.1	12.7
420≤x<520	28.6	28.6	15.9

Example:

Total capacity connected downstream for B1 = capacity index indoor 2 + capacity index indoor 3 + capacity index indoor 4 = 270

Total capacity connected downstream for B2 = capacity index indoor 3 + capacity index indoor 4 = 190

C. Piping between refrigerant branch kit and indoor unit

Pipe size for direct connection to indoor unit must be the same as the connection size of the indoor unit:

	Piping outer diameter size (mm)		
	Suction gas pipe	Discharge gas pipe	Liquid pipe
EKHVM(R/Y)D	15.9	12.7	9.5
EKHBRD	—	15.9	9.5

- The pipe thickness of the refrigerant piping shall comply with the applicable legislation. The minimal pipe thickness for R410A piping must be in accordance with the table below.

Pipe Ø	Minimal thickness t (mm)
6.4	0.80
9.5	0.80
12.7	0.80
15.9	0.99
19.1	0.80
22.2	0.80
28.6	0.99

- In case the required pipe sizes (inch sizes) are not available, it is also allowed to use other diameters (mm sizes), taken the following into account:
  - select the pipe size nearest to the required size.
  - use the suitable adapters for the change-over from inch to mm pipes (field supply).

9.3. Selection of refrigerant branch kits

Refrigerant refnets

- When using refnet joints at the first branch counted from the outdoor unit side, choose from the following table in accordance with the capacity of the outdoor unit (example: refnet joint a)

Outdoor unit capacity type (Hp)	Refrigerant branch kit name	
	3 pipes	2 pipes
8+10	KHRQ23M29T9	KHRQ22M29T9
12~16	KHRQ23M64T	KHRQ22M64T

When all connected indoor units are heating only (EKHVMRD or EKHBRD, only 2 pipes), at that moment the first refrigerant branch kit is for a 2 pipe system.
If 1 indoor unit is reversible, then you must select a refrigerant branch kit for a 3 pipe system.

- For refnets joints other than the first branch (example refnet joint b and c), select the proper branch kit model based on the total capacity index of all indoor units connected after the refrigerant branch.

Indoor unit capacity index	Refrigerant branch kit name	
	3 pipes	2 pipes
<200	KHRQ23M20T	KHRQ22M20T
200≤x<290	KHRQ23M29T9	KHRQ22M29T
290≤x<520	KHRQ23M64T	KHRQ22M64T

- Concerning refnet headers, choose from the following table in accordance with the total capacity of all the indoor units connected below the refnet header:

Indoor unit capacity index	Refrigerant branch kit name	
	3 pipes	2 pipes
<200	KHRQ23M29H	KHRQ22M29H
200≤x<290	KHRQ23M29H	KHRQ22M29H
290≤x<520	KHRQ23M64H	KHRQ22M64H

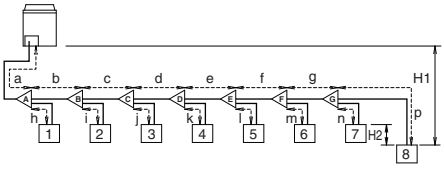
NOTE Refrigerant branch kits can only be used with R410A.

9.4. System piping limitations

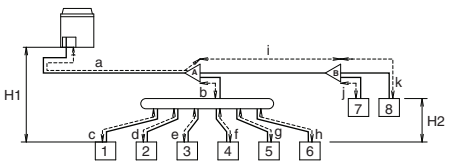
Piping length restrictions

Make sure to perform the piping installation within the range of the maximum allowable pipe length, allowable level difference and allowable length after branching as indicated below:

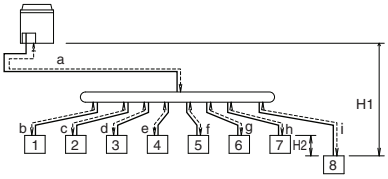
Example 1: Branch with refnet joint



Example 2: Branch with refnet joint and refnet header



Example 3: Branch with refnet header



Maximum allowable lengths

Actual pipe length between outdoor and indoor unit ≤100 m
Example 1: a+b+c+d+e+f+g+p≤100 m
Example 2: a+i+k≤100 m
Example 3: a+i≤100 m

Equivalent piping length between indoor and outdoor units ≤120 m (equivalent pipe length of refnet to be taken 0.5 m and for header 1.0 m)

Total piping length from outdoor to all indoor units ≤300 m

Pipe length from first branch kit (either refnet joint or refnet header) to indoor unit ≤40 m

[Example 1]: unit 8: b+c+d+e+f+g+p≤40 m
[Example 2]: unit 6: b+h≤40 m, unit 8: i+k≤40 m
[Example 3]: unit 8: i≤40 m

Maximum allowable height difference

Difference in height between outdoor and indoor units H1≤40 m

Difference in height between lowest and heighest indoor unit H2≤15 m

If setting [A-01] (this is an indoor unit setting) is changed, maximum H2 difference can be increased to 25 m. Refer to field settings in the indoor unit installation manual for more information.

This setting cannot be used for EKHBRD units. Maximum H2 differrence for EKHBRD units is limited to 15 m.

NOTE

When the equivalent pipe length between outdoor and indoor units is 90 m or more, the size of the main liquid pipe must be increased. Never increase suction gas pipe and discharge gas pipe sizes.

Depending on the length of the piping, the capacity may drop, but even in such a case it is possible to increase the size of the main liquid pipe.

HP	Liquid Ø (mm)
8+10	9.5 → 12.7
12~16	12.7 → 15.9

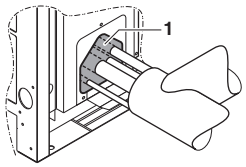
Make sure to perform the piping installation within the range of the maximum allowable pipe length, allowable level difference and allowable length after branching as indicated above.

10. Precautions on refrigerant piping

- Do not allow anything other than the designated refrigerant to get mixed into the freezing cycle, such as air, etc. If any refrigerant gas leaks while working on the unit, ventilate the room thoroughly right away.
- Use R410A only when adding refrigerant
- Installation tools:
  Make sure to use installation tools (gauge manifold charge hose, etc.) that are exclusively used for R410A installations to withstand the pressure and to prevent foreign materials (e.g. mineral oils and moisture) from mixing into the system.
- Vacuum pump:
  Use a 2-stage vacuum pump with a non-return valve.
  Make sure the pump oil does not flow oppositely into the system while the pump is not working.
  Use a vacuum pump which can evacuate to –100.7 kPa (5 Torr, –755 mm Hg).
- Protection against contamination when installing pipes
  - Take measures to prevent foreign materials like moisture and contamination from mixing into the system.

	Installation period	Protection method
	More than a month	Pinch the pipe
	Less than a month	Pinch or tape the pipe
	Regardless of the period	

  - Block all gaps in the holes for passing out piping and wiring using sealing material (field supply). (The capacity of the unit will drop and small animals may enter the machine.)
    Example: passing piping out through the front



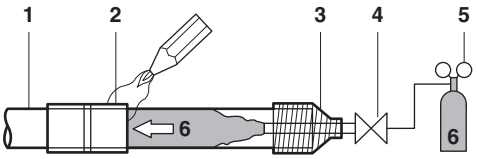
1 Plug the areas marked with "▬".
(When the piping is routed from the front panel.)

  - 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 or dirt enters the pipe.

After all the piping has been connected, make sure there is no gas leak. Use nitrogen to perform a gas leak check.

10.1. Caution for brazing

- Make sure to blow through with nitrogen when brazing.
  Blowing through with nitrogen prevents the creation of large quantities of oxidized film on the inside of the piping. An oxidized film adversely affects valves and compressors in the refrigerating system and prevents proper operation.
- The nitrogen pressure should be set to 0.02 MPa (i.e., just enough so it can be felt on the skin) with a pressure-reducing valve.



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

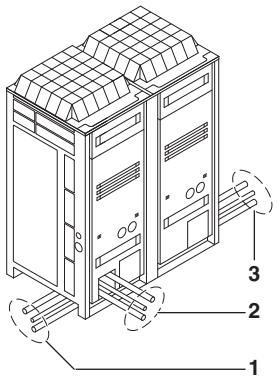
- Do not use anti-oxidants when brazing the pipe joints.
  Residue can clog pipes and break equipment.
- Do not use flux when brazing copper-to-copper refrigerant piping. Use phosphor copper brazing filler alloy (BCuP) which does not require flux.
- Flux has an extremely harmful influence on refrigerant piping systems. For instance, if chlorine based flux is used, it will cause pipe corrosion or, in particular, if the flux contains fluorine, it will deteriorate the refrigerant oil.

10.2. Connecting the refrigerant piping

NOTE

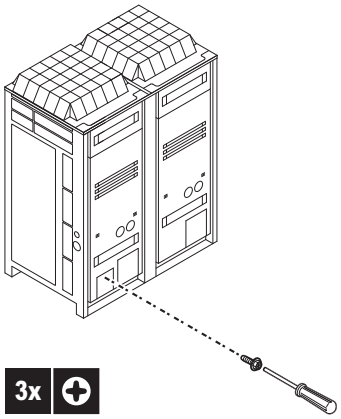
- Installation shall be done by an installer, the choice of materials and installation shall comply with the applicable legislation. In Europe the EN378 is the applicable standard that shall be used.
- Ensure that the field piping and connections are not subjected to stress.

1. Decide front or side connection.
Installation of refrigerant piping is possible as front connection or side connection (when taken out from the bottom) as shown in the figure below:

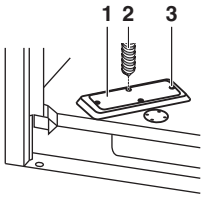


1 Left-side connection
2 Front connection
3 Right-side connection

For front connection, please remove the front cover as follows:



For side connections, the knock-out hole on the bottom plate should be removed:



1 Large knock-out hole
2 Drill
3 Points for drilling

NOTE

Precautions when knocking out knock-out holes

- Be sure to avoid damaging the casing
- After knocking out the knock-out holes, we recommend you remove the burrs and paint the edges and areas around the edges using repair paint to prevent rusting.
- When passing electrical wiring through the knock-out holes, wrap the wiring with protective tape to prevent damage as shown above.

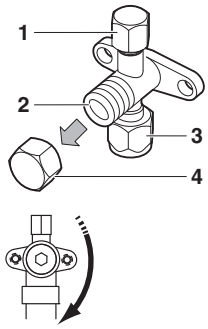
2. Remove the pinched pipes

NOTE

Any gas or oil remaining inside the stop valve may blow off the pinched piping. Failure to observe the instructions in procedure below properly may result in property damage or personal injury, which may be serious depending on the circumstances.

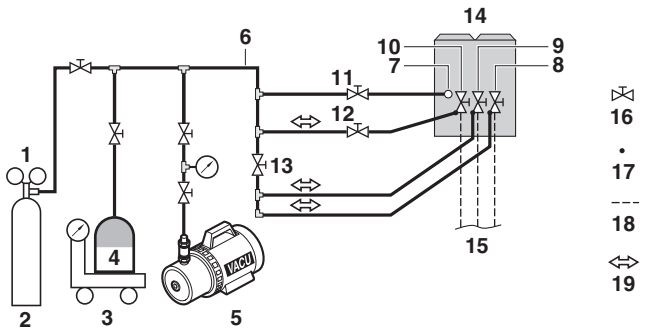
Use the following procedure to remove the pinched piping:

1 Remove the valve cover and make sure that the stop valves are fully closed.



1 Service port and service port cover
2 Stop valve
3 Field piping connection
4 Stop valve cover

2 Connect the vacuuming/recovery unit to service ports of all stop valves.



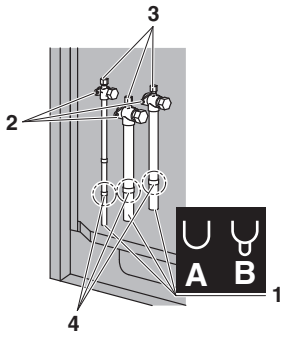
1 Gauge manifold
2 Nitrogen
3 Measuring instrument
4 Refrigerant R410A tank (siphon system)
5 Vacuum pump
6 Charge hose
7 Refrigerant charge port
8 Discharge pipe stop valve
9 Suction gas pipe stop valve
10 Liquid pipe stop valve
11 Valve A
12 Valve B
13 Valve C
14 Outdoor unit
15 To indoor unit
16 Stop valve
17 Service port
18 Field piping
19 Gas flow

3 Recover gas and oil from the pinched piping by using a recovery unit.

Do not vent gases into the atmosphere.

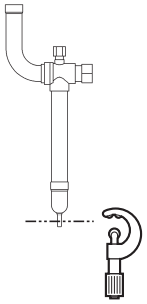
4 When all gas and oil is recovered from the pinched piping, disconnect the charge hose and close the service ports.

5 In case the pinched piping lower part looks like detail A in the figure below, follow instructions as per procedure steps 7-8.
In case the pinched piping lower part looks like detail B in the figure below, follow instructions as per procedure steps 6-7-8.



1	Pinched piping
2	Stop valve
3	Service port
4	Point of melting the brazing metal; cut pipe off just above this brazing or marking point

6 For discharge and suction gas stop valves, cut off the lower part of the smaller pinched piping with an appropriate tool (e.g. pipe cutter, a pair of nippers, …). Let the remaining oil drip out in case the recovery was not complete:



Wait until all oil is dripped out.

7 Cut the pinched piping off with a pipe cutter just above the brazing point or marking if there is no brazing point.

Never remove the pinched piping by brazing.

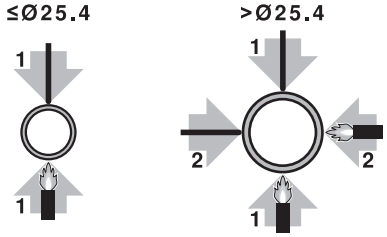
8 Wait until all oil is dripped out before continuing with the connection of the field piping in case the recovery was not complete.

3. Connecting refrigerant piping to the outdoor unit.

NOTE **All local interunit piping are field supplied except the accessory pipes.**

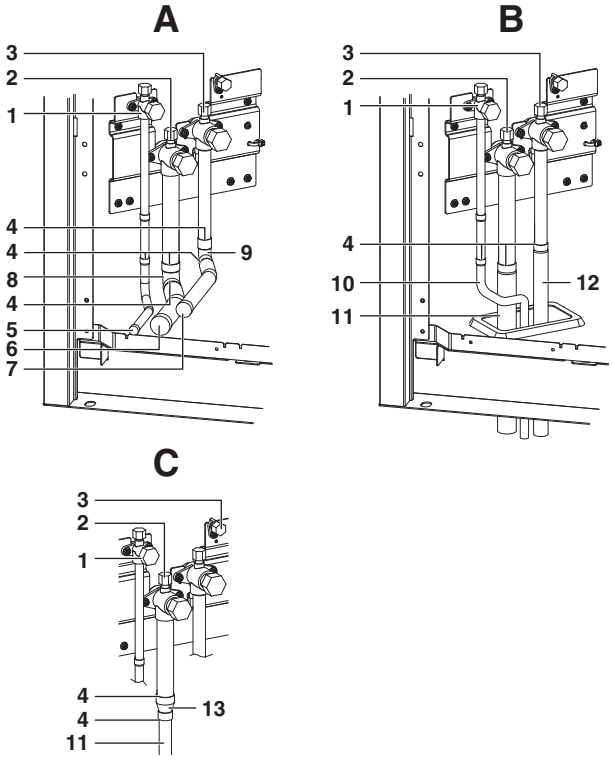
Precautions when connecting field piping.

Add brazing material as shown in the figure.



- Be sure to use the supplied accessory pipes when carrying out piping work in the field.
- Be sure that the field installed piping does not touch other pipes, the bottom panel or side panel. Especially for the bottom and side connection, be sure to protect the piping with suitable insulation, to prevent it from coming into contact with the casing.

Connection from the stop valves to the field piping using accessory pipes should be as below:

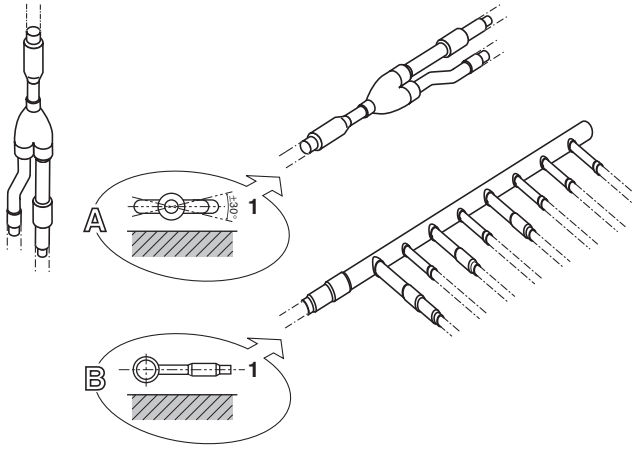


A	Front connection
B	Bottom connection
C	EMRQ8
1	Liquid pipe stop valve
2	Suction gas pipe stop valve
3	Discharge gas pipe stop valve
4	Brazing
5	Liquid accessory pipe (1)
6	Suction gas accessory pipe (1)
7	Discharge gas accessory pipe (1)
8	Accessory joint (angle 90°) (1)
9	Accessory joint (angle 90°) (2)
10	Liquid accessory pipe (2)
11	Suction gas accessory pipe (2)
12	Discharge gas accessory pipe (2)
13	Accessory joint

NOTE **Make sure that the onsite piping does not come in contact with other piping, the bottom frame or side panels of the unit.**

The connections above to the branch kits, are the responsibility of the installer (field piping).

4. Branching the refrigerant piping
   For installation of the refrigerant branching kit, refer to the installation manual delivered with the kit.



1 Horizontal surface

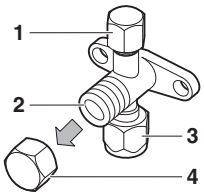
Follow the conditions listed below:

- Mount the refnet joint so that it branches either horizontally or vertically.
- Mount the refnet header so that it branches horizontally.

10.3. Guidelines for handling stop valve

Cautions on handling the stop valve

- Make sure to keep both stop valves open during operation.
- The figure below shows the name of each part required in handling the stop valve.



1 Service port and service port cover
2 Stop valve
3 Field piping connection
4 Stop valve cover

- The stop valve is factory closed.

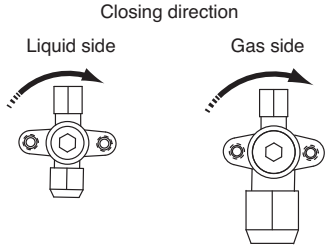
How to use the stop valve

Opening the stop valve

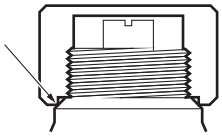
1. Remove the valve cover.
2. Insert a hexagon wrench (liquid side: 4 mm, suction and discharge side: 8 mm) into the stop valve and turn the stop valve counterclockwise.
3. When the stop valve cannot be turned any further, stop turning. The valve is now open.

Closing the stop valve

1. Remove the valve cover.
2. Insert a hexagon wrench (liquid side: 4 mm, suction and discharge side: 8 mm) into the stop valve and turn the stop valve clockwise.
3. When the stop valve cannot be turned any further, stop turning. The valve is now closed.



Cautions on handling the stop valve cover



- The stop valve cover is sealed where indicated by the arrow. Take care not to damage it.
- After handling the stop valve, make sure to tighten the stop valve cover securely. For the tightening torque, refer to the table below.
- Check for refrigerant leaks after tightening the stop valve cover.

Cautions on handling the service port

- Always use a charge hose equipped with a valve depressor pin, since the service port is a Schrader type valve.
- After handling the service port, make sure to tighten the service port cover securely. For the tightening torque, refer to the table below.
- Check for refrigerant leaks after tightening the service port cover.

Tightening torques

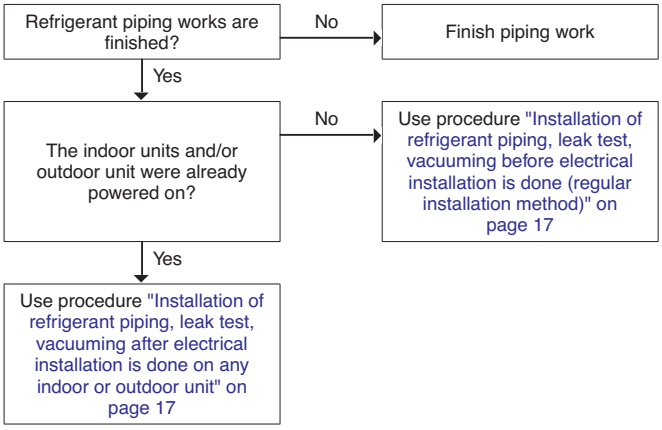
Item	Tightening torque (N·m)				
	8	10	12	14	16
Stop valve cover, liquid side	13.5~16.5			18~22	
Stop valve cover, suction side	22.5~27.5				
Stop valve cover, discharge side					
Service port cover	11.5~13.9				

10.4. Leak test and vacuum drying

It is very important that all refrigerant piping work is done before the units (outdoor or indoor) are powered on.

When the units are powered on, the expansion valves will initialize. This means that they will close. Leak test and vacuuming drying of field piping and indoor units is impossible when this happens.

Therefore, there will be explained 2 methods for initial installation, leak test and vacuuming drying.



General guidelines

- Use a 2-stage vacuum pump with a non-return valve which can evacuate to a gauge pressure of –100.7 kPa (5 Torr absolute, –755 mm Hg).
- Connect the vacuum pump to the service port of all 3 stop valves to increase efficiency (refer to "Set-up" on page 17).

NOTE Do not purge the air with refrigerants. Use a vacuum pump to evacuate the installation.

Installation of refrigerant piping, leak test, vacuuming **before** electrical installation is done (regular installation method)

When all piping work is complete, it is necessary to:

- check for any leakages in the refrigerant piping and
- to perform vacuum drying to remove all moisture in the refrigerant piping.

If there is a possibility of moisture being present in the refrigerant piping (for example, rainwater may have entered the piping), carry out the vacuum drying procedure below until all moisture has been removed and consider the installation of a liquid dryer.

All piping inside the unit has been factory tested for leaks.

Only field installed refrigerant piping needs to be checked. Therefore, make sure that all the outdoor unit stop valves are firmly closed before performing leak test or vacuum drying.

NOTE

Make sure that **ALL** indoor unit stop valves are **OPEN** (no outdoor unit stop valves!) before you start leak test and vacuuming.

See "Set-up" on page 17, "Leak test" on page 18, and "Vacuum drying" on page 18.

Installation of refrigerant piping, leak test, vacuuming **after** electrical installation is done on any indoor or outdoor unit

Apply outdoor unit setting 2-21=1 (see page 30) before starting leak test and vacuuming. This setting will open all field expansion valves and solenoid valves to guarantee a R410A piping pathway.

NOTE

- Make sure that **ALL** indoor unit stop valves are **OPEN** (no outdoor unit stop valves!) before you start leak test and vacuuming.
- Make sure that **ALL** indoor units connected to the outdoor unit are powered on.
- Wait untill the outdoor unit has finished the initialisation.

When all piping work is complete, it is necessary to:

- check for any leakages in the refrigerant piping and
- to perform vacuum drying to remove all moisture in the refrigerant piping.

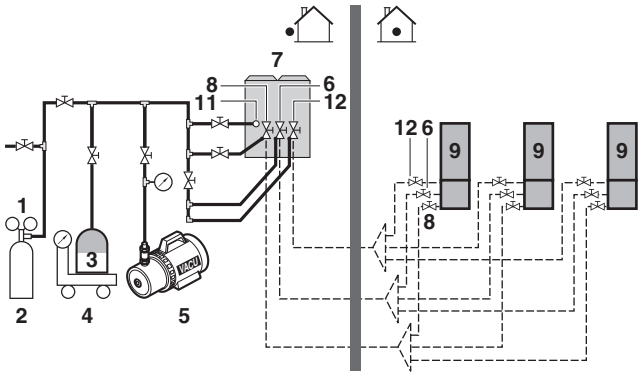
If there is a possibility of moisture being present in the refrigerant piping (for example, rainwater may have entered the piping), first carry out the vacuum drying procedure below until all moisture has been removed and consider the installation of a liquid dryer.

All piping inside the unit has been factory tested for leaks.

Only field installed refrigerant piping needs to be checked. Therefore, make sure that all the stop valves are firmly closed before performing leak test or vacuum drying.

See "Set-up" on page 17, "Leak test" on page 18, and "Vacuum drying" on page 18.

Set-up



1	Pressure reducing valve
2	Nitrogen
3	Refrigerant R410A tank (siphon system)
4	Measuring instrument
5	Vacuum pump
6	Suction pipe stop valve
7	Outdoor unit
8	Liquid pipe stop valve
9	Indoor unit(s)
10	Charge hose
11	Refrigerant charge port
12	Discharge pipe stop valve
⋈	Valve
•	Stop valve service port

NOTE

The connections to the indoor units and all indoor units should also be leak and vacuum tested. Keep the stop valves of the indoor units open as well.

Refer to the indoor unit installation manual for more details.

Leak test and vacuum drying should be done before the power supply is set to the unit. See also the flow chart earlier described in this chapter.

Leak test

The leak test must satisfy specification EN 378-2.

1 Vacuum leak test

1.1 Evacuate the system from the liquid, gas and high pressure piping to –100.7 kPa (5 Torr) for more than 2 hours.

1.2 Once reached, turn off the vacuum pump and check that the pressure does not rise for at least 1 minute.

1.3 Should the pressure rise, the system may either contain moisture (see vacuum drying below) or have leaks.

2 Pressure leak test

2.1 Break the vacuum by pressurizing with nitrogen gas to a minimum gauge pressure of 0.2 MPa (2 bar).
Never set the gauge pressure higher than the maximum operation pressure of the unit, i.e. 4.0 MPa (40 bar).

2.2 Test for leaks by applying a bubble test solution to all piping connections.

Make sure to use a recommended bubble test solution from your wholesaler.
Do not use soap water, which may cause cracking of flare nuts (soap water may contain salt, which absorbs moisture that will freeze when the piping gets cold), and/or lead to corrosion of flared joints (soap water may contain ammonia which causes a corrosive effect between the brass flare nut and the copper flare).

2.3 Discharge all nitrogen gas.

Vacuum drying

To remove all moisture from the system, proceed as follows:

1 Evacuate the system for at least 2 hours to a target vacuum of –100.7 kPa.

2 Check that, with the vacuum pump turned off, the target vacuum is maintained for at least 1 hour.

3 Should you fail to reach the target vacuum within 2 hours or maintain the vacuum for 1 hour, the system may contain too much moisture.

4 In that case, break the vacuum by pressurizing with nitrogen gas to a gauge pressure of 0.05 MPa (0.5 bar) and repeat steps 1 to 3 until all moisture has been removed.

5 The outdoor stop valves can now be opened, and/or additional refrigerant can be charged (see "13.4. Method for adding refrigerant" on page 24).

NOTE

After opening the stop valve, it is possible that the pressure in the refrigerant piping does not rise. This might be caused by e.g. the closed state of the expansion valve in the outdoor unit circuit, but does not present any problem for correct operation of the unit.

NOTE

The connections to the indoor units and all indoor units should also be leak and vacuum tested. Keep the stop valves of the indoor units open as well.

Refer to the indoor unit installation manual for more details.

Leak test and vacuum drying should be done before the power supply is set to the unit. If not, see "10.4. Leak test and vacuum drying" on page 16 for more information.

11. Pipe insulation

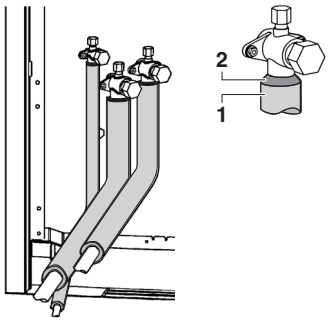
After finishing the leak test and vacuum drying, the piping must be insulated. Take into account the following points:

- Make sure to insulate the connection piping and refrigerant branch kits entirely.
- Be sure to insulate liquid, suction, and discharge piping (for all units).
- Use heat resistant polyethylene foam which can withstand a temperature of 70°C for liquid piping and polyethylene foam which can withstand a temperature of 120°C for gas piping.
- Reinforce the insulation on the refrigerant piping according to the installation environment.

Ambient temperature	Humidity	Minimum thickness
≤30°C	75% to 80% RH	15 mm
>30°C	≥80% RH	20 mm

Condensation might form on the surface of the insulation.

- If there is a possibility that condensation on the stop valve might drip down into the indoor unit through gaps in the insulation and piping because the outdoor unit is located higher than the indoor unit, this must be prevented by sealing up the connections. See below.



1 Insulation material

2 Caulking, etc.

12. Electrical wiring work

12.1. Precautions on electrical wiring work

WARNING: Electrical installation

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

NOTE

Electrical wiring work recommendations.

To persons in charge of electrical wiring work:
Do not operate the unit until the refrigerant piping is complete. See "10.4. Leak test and vacuum drying" on page 16.

Running the unit before the piping is ready will break the compressor.

DANGER: ELECTRICAL SHOCK

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

WARNING

- A main switch or other means for disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with the applicable legislation.
- Use only copper wires.
- All field wiring must be carried out in accordance with the wiring diagram supplied with the unit and the instructions given below.
- Never squeeze bundled cables and be sure that it does not come in contact with the non-insulated piping and sharp edges. Be sure no external pressure is applied to the terminal connections.
- Power supply wires must be attached securely.
- If the power supply has a missing or wrong N-phase, equipment will break down.
- Be sure to establish an earth. Do not earth the unit to a utility pipe, surge absorber, or telephone earth. Incomplete earth may cause electrical shock.
- Be sure to install an earth leakage protector in accordance with the applicable legislation. Failure to do so may cause electric shock or fire.
- Be sure to use a dedicated power circuit, never use a power supply shared by another appliance.
- When installing the earth leakage protector be sure that it is compatible with the inverter (resistant to high frequency electric noise) to avoid unnecessary opening of the earth leakage protector.
- As this unit is equipped with an inverter, installing a phase advancing capacitor not only will deteriorate power factor improvement effect, but also may cause a capacitor abnormal heating accident due to high-frequency waves. Therefore, never install a phase advancing capacitor.
- Be sure to install the required fuses or circuit breakers.
- Do not operate until refrigerant piping work is completed. (If operated before completion of the piping work, the compressor may break down.)
- Never remove a thermistor, sensor, etc., when connecting power wiring and transmission wiring. (If operated without thermistor, sensor, etc., the compressor may break down.)
- The reversed phase protection detector of this product only functions when the product starts up. Consequently reversed phase detection consequently is not performed during normal operation of the product.
- The reversed phase protection detector is designed to stop the product in the event of an abnormality when the product is started up.
- Replace two of the three phases (L1, L2, and L3) during reverse-phase protection circuit operation.
- If there exists the possibility of reversed phase after a momentary black out and the power goes on and off while the product is operating, attach a reversed phase protection circuit locally. Running the product in reversed phase can break the compressor and other parts.

Point of attention regarding quality of the public electric power supply.

This equipment complies with respectively:

- EN/IEC 61000-3-11(1) provided that the system impedance Z_{sys} is less then or equal to Z_{max}.
- EN/IEC 61000-3-12(2) provided that the short-circuit power S_{sc} is greater than or equal to the minimum S_{sc} value

at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with respectively:

- Z_{sys} less than or equal to Z_{max}
- S_{sc} greater than or equal to the minimum S_{sc} value.

	Z_{max} (Ω)	Minimum S_{sc} value
EMRQ8	—	889 kVA
EMRQ10	0.27	843 kVA
EMRQ12	0.27	850 kVA
EMRQ14	—	2045 kVA
EMRQ16	—	2035 kVA

12.2. Internal wiring – Parts table

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

A1P~A8P.....Printed circuit board (main, sub 1, sub 2, noise filter, inverter, fan, current sensor)

BS1~BS5.....Push button switch (mode, set, return, test, reset)

C1,C63,C66.....Capacitor

E1HC,E2HC .....Crankcase heater

F1U.....Fuse (DC 650 V, 8 A)

F1U.....Fuse (T, 3.15 A, 250 V)

F1U,F2U.....Fuse (T, 3.15 A, 250 V)

F5U.....Field fuse (field supply)

F400U.....Fuse (T, 6.3 A, 250 V)

H1P~H8P .....Pilot lamp

H2P .....Under preparation or in test operation when blinking

H2P .....Malfunction detection when light up

HAP .....Pilot lamp (service monitor - green)

K1,K3.....Magnetic relay

K1R .....Magnetic relay (K2M, Y4S)

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

K2,K4 ..... Magnetic contactor (M1C)
K2R..... Magnetic relay (Y5S)
K3R..... Magnetic relay (Y1S)
K4R..... Magnetic relay (Y8S)
K5R..... Magnetic relay (Y2S)
K5R..... Magnetic relay (for option)
K6R..... Magnetic relay (Y7S)
K7R,K8R..... Magnetic relay (E1HC, E2HC)
K11R..... Magnetic relay (Y3S)
L1R,L2R ..... Reactor
M1C,M2C ..... Motor (compressor)
M1F,M2F..... Motor (fan)
PS..... Switching power supply
Q1DI ..... Earth leakage protector (field supply)
Q1RP..... Phase reversal detection circuit
R1T..... Thermistor (air, fin)
R2T~R15T..... Thermistor (H/E gas 1, H/E de-icer 1, sub cool H/E gas 1, sub cool H/E liquid, H/E liquid 1, suction 1, liquid 1, suction 2, H/E gas 2, H/E de-icer 2, sub cool H/E gas 2, liquid 2, H/E liquid 2)
R10 ..... Resistor (current sensor)
R31T,R32T ..... Thermistor (discharge) (M1C,M2C)
R50,R59 ..... Resistor
R90 ..... Resistor (current sensor)
R95 ..... Resistor (current limiting)
S1NPH..... Pressure sensor (high)
S1NPL ..... Pressure sensor (low)
S1PH,S2PH..... Pressure switch (high)
SD1..... Safety devices input
T1A ..... Current sensor
V1R..... Diode bridge
V1R,V2R..... Power module
X1A~X9A..... Connector
X1M ..... Terminal strip (power supply)
X1M ..... Terminal strip (control)
X2M ..... Terminal strip (relay)
Y1E~Y5E..... Electronic expansion valve (main 1, sub cool 1, main 2, charge, sub cool 2)
Y1S~Y10S..... Solenoid valve (RMTG, 4 way valve–H/E gas 1, RMTL, hot gas, EV bypass 1, RMTT, RMTO, 4 way valve–H/E gas 2, EV bypass 2)
Z1C~Z12C..... Noise filter (ferrite core)
Z1F ..... Noise filter (with surge absorber)
L1,L2,L3..... Live
N ..... Neutral
..... Field wiring
..... Terminal strip
..... Connector
..... Terminal
..... Protective earth (screw)
BLK..... Black
BLU..... Blue
BRN..... Brown
GRN..... Green
GRY..... Grey
ORG ..... Orange
PNK ..... Pink
RED ..... Red
WHT ..... White
YLW ..... Yellow

NOTE

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

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

12.3. System overview of field wiring

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

12.4. Requirements

The power supply must be protected with the required safety devices, i.e. a main switch, a slow blow fuse on each phase and an earth leakage protector in accordance with the applicable legislation.

Selection and sizing of the wiring should be done in accordance with the applicable legislation based on the information mentioned in the table below:

	Phase and frequency	Voltage	Maximum current	Recommended fuses
EMRQ8	3N~ 50 Hz	380~415 V	17.1 A	20 A
EMRQ10	3N~ 50 Hz	380~415 V	22.1 A	25 A
EMRQ12	3N~ 50 Hz	380~415 V	22.3 A	25 A
EMRQ14	3N~ 50 Hz	380~415 V	32.8 A	40 A
EMRQ16	3N~ 50 Hz	380~415 V	33.0 A	40 A

Transmission wiring should have a line section of 0.75~1.25 mm^2. For the transmission wiring, the maximum wiring length is 1000 m.

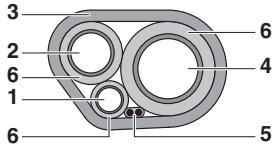
If the total transmission wiring exceeds these limits, it may result in communication error.

12.5. Routing

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

Transmission wiring routing

The transmission wiring should be wrapped and routed together with the field piping as follows:



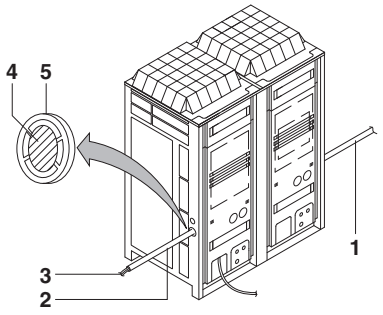
1 Liquid pipe
2 Discharge gas pipe
3 Finishing tape
4 Suction gas pipe
5 Transmission wiring
6 Insulation material

Field piping can be routed from left, right or front. Refer to "10.2. Connecting the refrigerant piping" on page 13.

Power supply routing

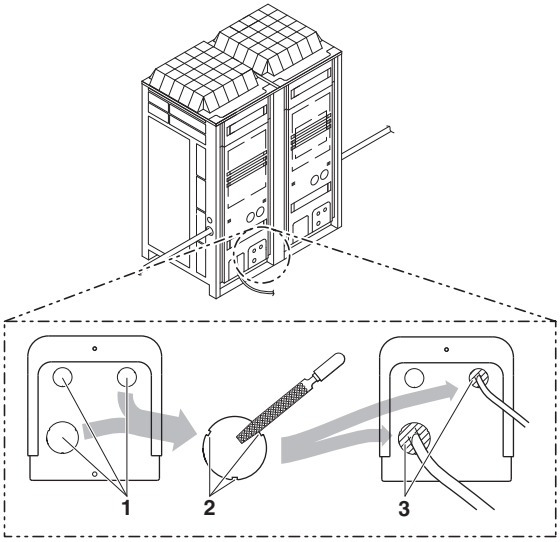
The power supply can be routed from the front, left and right side.

1 Left and right side. The plastic conduit hole on the left and right side can be opened as follows:



1 Power supply inside a conduit
2 Conduit
3 Power supply
4 Cut off the shaded zones before usage
5 Through hole cover

2 Front side.
In order to route the power supply from the front side, the available knock-out holes can be used:



1 Knock-out hole
2 Burr
3 If there are any possibilities that small animals enter the system through the knock-out holes, plug the holes with packing materials (to be prepared on-site).

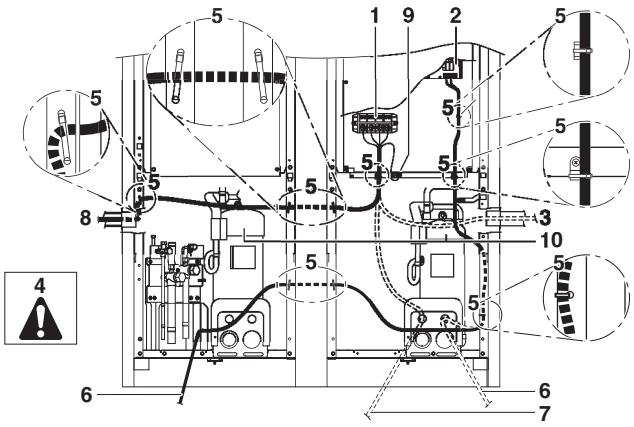
Precautions when knocking out knock-out holes

- To punch a knock-out hole, hit on it with a hammer.
- After knocking out the holes, we recommend removing any burrs and paint the edges and areas around the holes using repair paint to prevent rusting.
- When passing electrical wiring through the knock-out holes, prevent damage to the wires by wrapping the wiring with protective tape, putting the wires through field supplied protective wire conduits at that location, or install suitable field supplied wire nipples or rubber bushings into the knock-out holes.

12.6. Connection

This chapter gives an explanation how to route and connect the wiring within the unit.

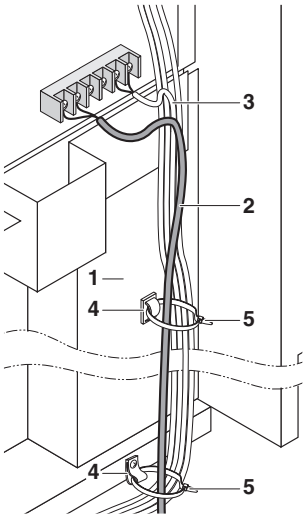
1 Routing inside the unit
For routing of the wiring inside the unit, please follow the figure below:



1 Power supply
2 Transmission wiring
3 Routing out power supply through the right side of the unit.
4 Secure a clearance of 25 mm or more between power supply and transmission wiring.
5 Clamp the wiring with field supplied clamps.
6 Routing out transmission wiring through the front of the unit.
7 Routing out the power supply through the front of the unit.
8 Routing out the power supply through the left side of the unit.
9 Earth wire from power supply.
10 When wiring, pay attention not to detach the acoustic insulators from the compressor.

2 Connection of wiring to terminals.

2.1 Transmission wiring



1 Fix to the indicated plastic brackets using field supplied clamping material.
2 Wiring between the units (Indoor - outdoor) (F1+F2 left)
3 Internal transmission wiring (Q1+Q2)
4 Plastic bracket
5 Field supplied clamps

Care should be taken for connecting the wires to the terminal block.

See the table below for the tightening torque of the transmission wiring terminals.

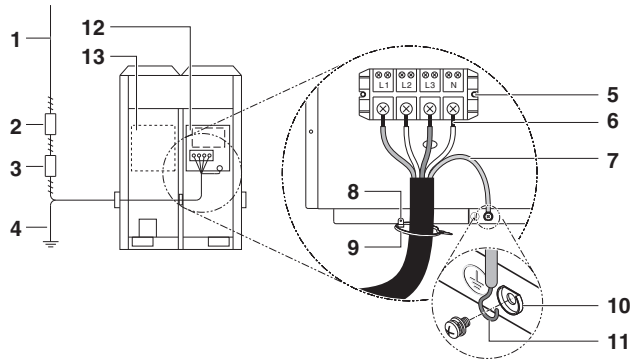
Screw size	Tightening torque (N·m)
M3.5 (A1P)	0.80~0.96

- Never connect the power supply to transmission wiring terminal block. Otherwise the entire system may break down.
- Be careful about polarity of the transmission wiring.

2.2 Power supply

The power supply must be clamped to the plastic bracket using field supplied clamp material.

The green and yellow striped wire must be used for earthing only. (refer figure below)



1	Power supply (380~415 V, 3N~ 50 Hz)
2	Earth leakage protector
3	Fuse
4	Earth wire
5	Power supply terminal block
6	Connect each power wire RED to L1, WHT to L2, BLK to L3 and BLU to N
7	Earth wire (GRN/YLW)
8	Clamp the power supply to the plastic bracket using a field supplied clamp to prevent external force being applied to the terminal.
9	Clamp (field supply)
10	Cup washer
11	When connecting the earth wire, it is recommended to perform curling.
12	Electric component box (1)
13	Electric component box (2) It is not required to open electric component box (2) for installation.

- When routing earth wires, secure clearance of 25 mm or more away from compressor lead wires. Failure to observe this instruction properly may adversely effect correct operation of other units connected to the same earth.
- When connecting the power supply, the earth connection must be made before the current-carrying connections are established. When disconnecting the power supply, the current-carrying connections must be separated before the earth connection is. The length of the conductors between the power supply stress relief and the terminal block itself must be such that the current-carrying wires are tautened before the earth wire is in case the power supply is pulled loose from the stress relief.

Precautions when laying power wiring

- For wiring, use the designated power wire and connect firmly, then secure to prevent outside pressure being exerted on the terminal board.
- Use an appropriate screwdriver for tightening the terminal screws. A screwdriver with a small head will damage the head and make proper tightening impossible.
- Over-tightening the terminal screws may break them.
- See the table below for tightening torque for the terminal screws.

Tightening torque (N·m)	
M8 (Power terminal block)	5.5~7.3
M8 (Earth)	

Recommendations when connecting the earth wire

Wire it so that it comes through the cut out section of the cup washer. (An improper earth connection may prevent a good earthing from being achieved.)

13. Charging refrigerant

13.1. Precautions

ATTENTION

- Refrigerant cannot be charged until field wiring has been completed.
- Refrigerant may only be charged after performing the leak test and the vacuum drying.
- When charging a system, care shall be taken that its maximum permissible charge is never exceeded, in view of the danger of liquid hammer.
- Charging with an unsuitable substance may cause explosions and accidents, so always ensure that the appropriate refrigerant R410A is charged.
- Refrigerant containers shall be opened slowly.
- Always use protective gloves and protect your eyes when charging refrigerant.
- When the refrigerant system is to be opened, refrigerant must be treated according to the applicable legislation.

DANGER: ELECTRICAL SHOCK

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

- To avoid compressor breakdown. Do not charge the refrigerant more than the specified amount.
- This outdoor unit is factory charged with refrigerant and depending on pipe sizes and pipe lengths some systems require additional charging of refrigerant. See "13.3. Calculating the additional refrigerant charge" on page 23.
- In case re-charge is required, refer to the nameplate of the unit. It states the type of refrigerant and necessary amount.

13.2. Important information regarding the refrigerant used

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

Refrigerant type: R410A
GWP(1) value: 1975

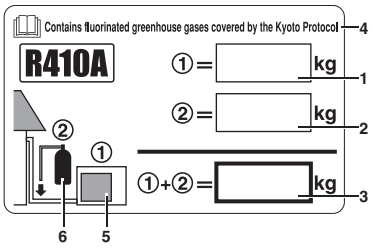
(1) GWP = global warming potential

Please fill in with indelible ink,

- ① the factory refrigerant charge of the product,
- ② the additional refrigerant amount charged in the field and
- ①+② the total refrigerant charge

on the fluorinated greenhouse gases label supplied with the product.

The filled out label must be adhered on the inside of the product and in the proximity of the product charging port (e.g. on the inside of the service cover).



1 factory refrigerant charge of the product: see unit name plate
2 additional refrigerant amount charged in the field
3 total refrigerant charge
4 contains fluorinated greenhouse gases covered by the Kyoto Protocol
5 outdoor unit
6 refrigerant cylinder and manifold for charging

NOTE National implementation of EU regulation on certain fluorinated greenhouse gases may require to provide the appropriate official national language on the unit. Therefore, an additional multilingual fluorinated greenhouse gases label is supplied with the unit.

Sticking instructions are illustrated on the backside of that label.

13.3. Calculating the additional refrigerant charge

NOTE There are 2 methods of calculating the additional refrigerant charge. Please choose the right method below.

System with the same indoor unit types

How to calculate the additional refrigerant to be charged

- When selecting EKHVMRD or EKHBRD as indoor unit type (all indoor units are of this type), select correction factor A=1.
- When selecting EKHVMYD as indoor unit type (all indoor units are of this type), select correction factor A=1.1.

	Indoor unit	
	EKHVMRD+EKHBRD	EKHVMYD
A	1	1.1

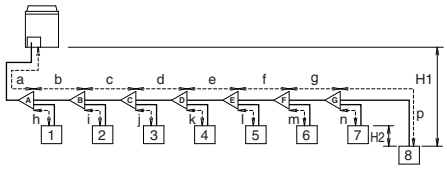
Additional refrigerant to be charged R (kg)

R should be rounded off in units of 0.1 kg

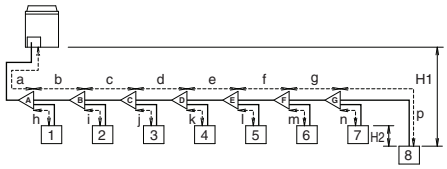
$R = [((X_1 \times Ø15.9) \times 0.18) + ((X_2 \times Ø12.7) \times 0.12) + ((X_3 \times Ø9.5) \times 0.059)] \times \mathbf{A}$

$\mathbf{X}_{1...3}$= Total length (m) of liquid piping size at **Øa**

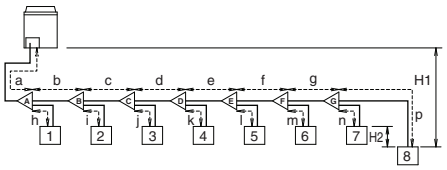
- **For EKHVMRD and EKHBRD**
  System liquid piping



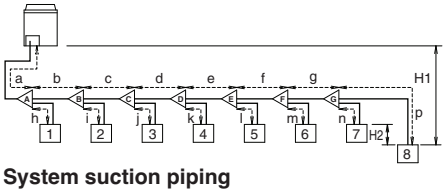
System discharge piping



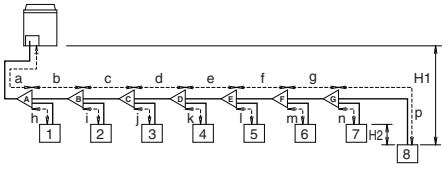
- **For EKHVMYD**
  System liquid piping



System discharge piping



System suction piping



System with different indoor unit types

How to calculate the additional refrigerant to be charged

When combining different indoor unit types, additional refrigerant amount calculation should be done based on the used pipe system.

- When using 2 pipe system (for connection of EKHVMRD or EKHBRD), please use correction factor A=1.
- When using 3 pipe system (for connection of EKHVMYD), please use correction factor A=1.1.

	Pipe system	
	2 pipe system	3 pipe system
A	1	1.1

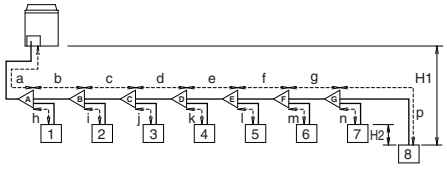
$R = \sum R_x$

$R_x = [((X_1 \times Ø15.9) \times 0.18) + ((X_2 \times Ø12.7) \times 0.12) + ((X_3 \times Ø9.5) \times 0.059)] \times \mathbf{A}$

$\mathbf{X}_{1...3}$= Total length (m) of liquid piping size at **Øa**

See the example below for more information.

Example

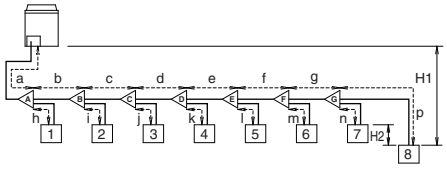


Unit 1~5: EKHVMRD (2 pipe)

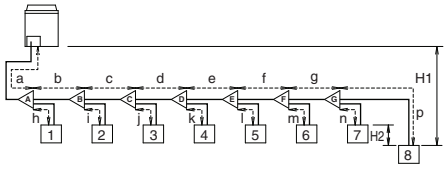
Unit 7: EKHVMRD (2 pipe)

Unit 6+8: EKHVMYD (3 pipe)

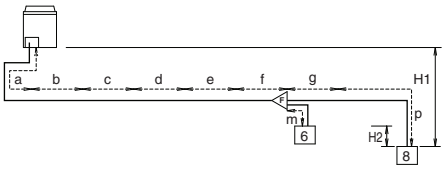
System liquid piping



System discharge piping



System suction piping



Distance	Correction factor (A)	Pipe system
a+b+c+d+e+f+g+p	1.1	3
h+i+j+k+l+n	1	2
m	1.1	3

Refnet	Refnet type
A+B+C+D+E+G	KHRQ22*
F	KHRQ23*

Additional refrigerant to be charged R (kg)

R should be rounded off in units of 0.1 kg

$R = R_1+R_2+R_3$

R_1~(a+b+c+d+e+g)

$R_1 = [((X_1 \times Ø15.9) \times 0.18) + ((X_2 \times Ø12.7) \times 0.12) + ((X_3 \times Ø9.5) \times 0.059)] \times \mathbf{1.1}$

R_2~(h+i+j+k+l+n)

$R_2 = [((X_1 \times Ø15.9) \times 0.18) + ((X_2 \times Ø12.7) \times 0.12) + ((X_3 \times Ø9.5) \times 0.059)] \times \mathbf{1}$

R_3~(m)

$R_3 = [((X_1 \times Ø15.9) \times 0.18) + ((X_2 \times Ø12.7) \times 0.12) + ((X_3 \times Ø9.5) \times 0.059)] \times \mathbf{1.1}$

$\mathbf{X}_{1...3}$= Total length (m) of liquid piping size at **Øa**

13.4. Method for adding refrigerant

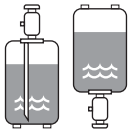
Precautions when adding refrigerant

Be sure to charge the specified amount of refrigerant in liquid state.

Since this refrigerant is a mixed refrigerant, adding it in gas form may cause the refrigerant composition to change, preventing normal operation.

- Before charging, check whether the refrigerant cylinder is equipped with a siphon tube or not.

Charge the liquid refrigerant with the cylinder in upright position.



Charge the liquid refrigerant with the cylinder in up-side-down position.

- Be sure to use tools exclusively for R410A to ensure required pressure resistance and to prevent foreign materials from mixing into the system.

Charging with an unsuitable substance may cause explosions and accidents, so always make sure that the appropriate refrigerant (R410A) is charged.

Refrigerant containers must be opened slowly.

- When charging a system, charging over the permissible quantity can cause liquid hammer.
- Always use protective gloves and protect your eyes when charging refrigerant.

Charging method

As explained during vacuum drying method, once vacuum drying is finished, additional refrigerant charging can start.

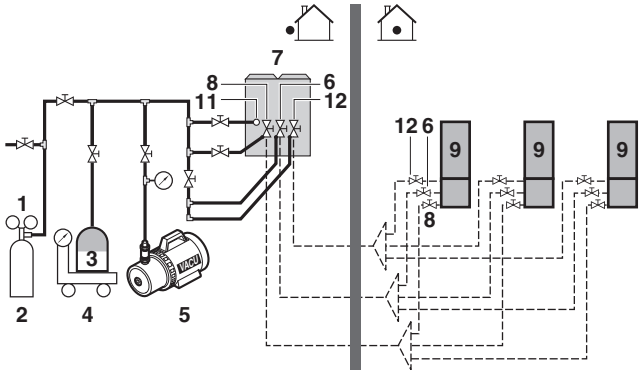
Follow the steps as described below.

1 Calculate the amount of refrigerant to be added using the formula mentioned in "13.3. Calculating the additional refrigerant charge" on page 23.

The first 10 kg of refrigerant can be charged without outdoor unit operation. If the additional refrigerant amount is smaller than 10 kg, perform the precharging procedure as explained in step 2 below. If the additional refrigerant charge is larger than 10 kg, perform step 2 and perform step 3 till the end of the procedure.

2 Precharging can be done without compressor running by connecting the refrigerant bottle only to the liquid stop valve.

Make sure that the stop valves are closed:



1	Pressure reducing valve
2	Nitrogen
3	Refrigerant R410A tank (siphon system)
4	Measuring instrument
5	Vacuum pump
6	Gas pipe stop valve
7	Outdoor unit
8	Liquid pipe stop valve
9	Indoor unit(s)
10	Charge hose
11	Refrigerant charge port
12	Discharge pipe stop valve
⋈	Valve
•	Stop valve service port

3 If the total amount of refrigerant could not be charged by precharging, then connect the refrigerant bottle to the refrigerant charging port as described in the figure above.

4 Make sure to open all 3 stop valves of the outdoor unit (refer to "How to use the stop valve" on page 16).

> If the indoor units are all **heating only units**, your system is a 2 pipe system **(no 3 pipe)**. In this case, the suction stop valve should remain closed at all times.

5 Turn on the power of the indoor unit and outdoor unit.

Take all the precautions mentioned in "14. Start-up and configuration" on page 26 into account.
To be able to do this operation, the outdoor unit should be set in mode 2. Refer to "Field settings by push buttons" on page 27 for further explanation on how to do the necessary settings.

6 Push the **BS1 MODE** button for 5 sec, the H1P LED is on ☼.

7 Push the **BS2 SET** button 20 times until following LED combination is reached:

H1P	H2P	H3P	H4P	H5P	H6P	H7P
☼	●	☼	●	☼	●	●

8 Push the **BS3 RETURN** button to confirm setting 2-20 above.

9 Push the **BS2 SET** button to change the charge mode from **OFF** (OFF) to **ON** (ON). LED indication should change as follows

		H1P	H2P	H3P	H4P	H5P	H6P	H7P
OFF	(a)	☼	●	●	●	●	●	◑
ON		☼	●	●	●	●	◑	●

(a) This setting = factory setting

10 Push the **BS3 RETURN** button and the setting is defined.

11 Push the **BS3 RETURN** button again, and the refrigerant charging operation will start.

12 After charging the specified quantity of refrigerant, press the **BS3 RETURN** button to stop the operation.

NOTE The operation will automatically stop within 30 minutes. If charging is not completed after 30 minutes, set and perform the additional refrigerant charging operation again.

Checks after adding refrigerant

- Are the stop valves for liquid, discharge, and suction open?
- Is the amount of refrigerant, that has been added, recorded on the refrigerant charge label?

- Make sure to open the stop valves after charging the refrigerant.
- Operating with the stop valves closed will damage the compressor.
- If the indoor units are all **heating only units**, your system is a 2 pipe system **(no 3 pipe)**. In this case, the suction stop valve should remain closed at all times.

14. Start-up and configuration

ATTENTION

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

DANGER: ELECTRICAL SHOCK

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

14.1. Checks before initial start up

After the installation of the unit, first check the following items. Once all below checks are fulfilled, the unit must be closed, only then can the unit be powered up.

1 Installation

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

2 Field wiring

Be sure that the field wiring has been carried out according to the instructions described in the chapter "12. Electrical wiring work" on page 19, according to the wiring diagrams and according to the applicable legislation.

3 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.

4 Earth wiring

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

5 Insulation test of the main power circuit

Using a mega tester for 500 V, check that the insulation resistance of 2 MΩ or more is attained by applying a voltage of 500 V DC between power terminals and earth. Never use the mega tester for the transmission wiring.

6 Fuses, circuit breakers, or protection devices

Check that the fuses, circuit breakers, or the locally installed protection devices are of the size and type specified in the chapter "12. Electrical wiring work" on page 19. Be sure that neither a fuse nor a protection device has been bypassed.

7 Internal wiring

Visually check the switch box and the inside of the unit on loose connections or damaged electrical components.

8 Pipe size and pipe insulation

Be sure that correct pipe sizes are installed and that the insulation work is properly executed.

9 Stop valves

Be sure that the stop valves are open on both liquid, suction, and discharge side.
If the indoor units are all **heating only units**, your system is a 2 pipe system **(no 3 pipe)**. In this case, the suction stop valve should remain closed at all times.

10 Damaged equipment

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

11 Refrigerant leak

Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, try to repair the leak. If the recovery is unsuccessfull, call your local dealer. Do not touch any refrigerant which has leaked out of refrigerant piping connections. This may result in frostbite.

12 Oil leak

Check the compressor for oil leakage. If there is an oil leak, try to repair the leak. If the repairing is unsuccessfull, call your local dealer.

13 Air inlet/outlet

Check that the air inlet and outlet of the unit is not obstructed by paper sheets, cardboard, or any other material.

14 Additional refrigerant charge

The amount of refrigerant to be added to the unit shall be written on the included "Added refrigerant" plate and attached to the rear side of the front cover.

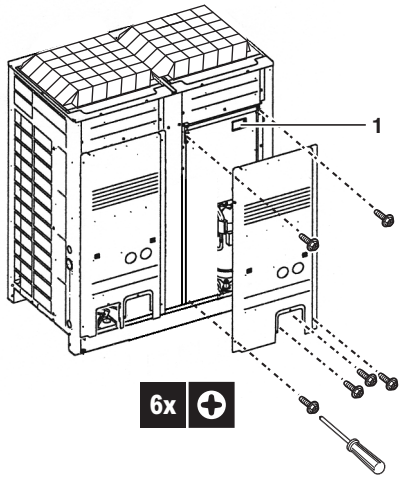
14.2. Field settings

The operation of the outdoor unit can further be defined by changing some settings.

This can be done through push buttons on the outdoor unit PCB as described below.

How to operate the push buttons

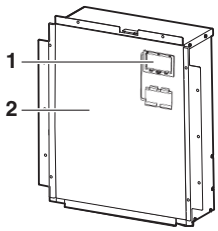
1 Open the front plate of the outdoor unit and access the switch box on the right side.



1 Push buttons

When carrying out field settings, remove the inspection cover (1).

Operate the push buttons with an insulated stick (such as a ball-point pen) to avoid touching live parts.



Make sure to re-attach the inspection cover (1) into the switch box cover (2) after the job is finished.

NOTE

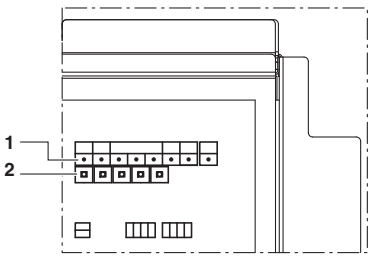
Make sure that all outside panels, except for the panel on the electric component box (1), are closed while working.

Close the lid of the electric component box firmly before turning on the power.

When opening the inspection cover (1), following LEDs and push buttons are visible:

1 LED H1P~H8P

2 Push buttons BS1~BS5



Different modes as explained below are set by pushing on the push buttons BS1~BS5.
By pushing the push buttons, the LEDs will display the different modes.
Throughout the manual, the status of the LEDs is indicated as follows:

● OFF

☼ ON

◐ Blinking

The functions of the push buttons are as follows:

MODE	TEST: ◐ / HWL: ☼	C/H SELECT: IND	C/H SELECT: MASTER	C/H SELECT: SLAVE	L.N.O.P	DEMAND	MULTI
● H1P	● H2P	☼ H3P	● H4P	● H5P	● H6P	● H7P	☼ H8P

BS1 MODE	BS2 SET	BS3 RETURN	BS4 TEST	BS5 RESET

BS1 MODE	For changing the set mode
BS2 SET	For field setting
BS3 RETURN	For field setting
BS4 TEST	For test operation
BS5 RESET	For resetting the address when the wiring is changed or when an additional indoor unit is installed

Once the above is checked and confirmed, turn on the power supply of the outdoor unit and all indoor units.

If the communication between indoor units and outdoor unit is normal, the LED state will be as above.

Make sure the power supply of the outdoor unit is set 6 hours before actual operation of the system to power the cranckcase heater.

Once the above is confirmed, the mode 2 can be set using **BS1 MODE** button as explained below.

- **For setting mode 2**: Press the **BS1 MODE** button for 5 seconds, the H1P LED is on ☼.

NOTE

If you get confused in the middle of the setting process, push the **BS1 MODE** button. This returns to setting mode 1 (H1P LED is off).

Field settings by push buttons

The following setting can be set with push buttons as explained in "How to operate the push buttons" on page 26.

- High static pressure setting.
  If the outdoor unit is installed indoors and the outdoor unit fan is ducted, to guarantee enough airflow, the outdoor unit fan rpm must be increased.

Once in mode 2 as explained above (H1P LED is on), push 18 times on the **BS2 SET** button until following LED state is shown:

H1P	H2P	H3P	H4P	H5P	H6P	H7P
☼	●	☼	●	●	☼	●

Push the **BS3 RETURN** button to define the required setting.

The setting can then be changed by pushing on the **BS2 SET** button. The above mentioned setting can be set **ON** (ON) or **OFF** (OFF). Following LED state is shown for the different settings:

		H1P	H2P	H3P	H4P	H5P	H6P	H7P
ON		☼	●	●	●	●	◐	●
OFF	(a)	☼	●	●	●	●	●	◐

(a) This setting = factory setting

Pushing the **BS3 RETURN** button defines the setting.
Finally, when pushing the **BS3 RETURN** button again the operation starts according to the setting.

Pushing **BS1 MODE** button will get you back to the initial led start point:

H1P	H2P	H3P	H4P	H5P	H6P	H7P
●	●	☼	●	●	●	●

WARNING

Settings which are familiar for VRV series may **NOT** be applied to this Daikin Altherma outdoor unit.

14.3. Test operation

After installation and once the field settings are defined, the installer is obliged to verify correct operation. Therefore a test run must be performed according to the procedures described below.

Precautions before starting test operation

During test operation, the outdoor unit and the indoor units will start up.

- Make sure that the preparations of all indoor units are finished (field piping, electrical wiring, air purge,...). See installation manual of the indoor units.

Do not insert fingers, rods or other objects into the air inlet or outlet. When the fan is rotating at high speed, it will cause injury.

Do not perform the test operation while working on the indoor units.

WARNING

- During tests never pressurize the appliances with a pressure higher than the maximum allowable pressure (as indicated on the nameplate of the unit).
- If refrigerant gas leaks, ventilate the area immediately. Toxic gas may be produced if refrigerant gas comes into contact with fire.
- Never directly touch any accidental leaking refrigerant. This could result in severe wounds caused by frostbite.
- Test run is possible for ambient temperatures between –20°C and 35°C.

DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS

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

DANGER: ELECTRICAL SHOCK

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

Provide a logbook and machine card.

In accordance with the applicable legislation, it may be necessary to provide a logbook with the equipment containing at least: info on maintenance, repair work, results of tests, stand-by periods, ….

Also, at least, following information shall be provided at an accessible place of the system:

- instructions for shutting down the system in case of an emergency
- name and address of fire department, police and hospital
- name, address and day and night telephone numbers for obtaining service.

In Europe, EN378 provides the necessary guidance for this logbook.

NOTE

Note that during the first running period of the unit, required power input may be higher. This phenomenon originates from the compressor that requires a 50 hour run elapse before reaching smooth operation and stable power consumption. Reason is that the scroll is made out of iron and that it takes some time to smooth the surfaces that make contact.

NOTE

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

Test operation

The procedure below describes the test operation of the complete system. This operation checks and judges following items:

- Check of the stop valves opening
- Check of wrong wiring
- Check of refrigerant overcharge
- Check of indoor unit operation

On top of this test operation, the indoor unit operation can also be checked separately. Refer to the indoor unit installation manual for more details.

- Make sure to carry out the test operation after the first installation. Otherwise, the malfunction code U3 will be displayed on the remote controller and normal operation can not be carried out.
- Abnormalities on indoor units can not be checked for each unit separately. After the test operation is finished, check the indoor units one by one by performing a normal operation using the remote controller.

1 Close all front panels except the front panel of the electric component box.

2 Turn ON the power to the outdoor unit and the connected indoor units.

Be sure to turn on the power 6 hours before operation in order to have power running to the crankcase heater and to protect the compressor.

3 Push **BS4 TEST** button for 5 seconds or more. The unit will start test operation.

- The test operation is automatically carried out in heating mode, the H2P LED will blink and the messages "Test operation" and "Under centralized control" will display on the remote controller.
- It may take 10 minutes to bring the state of the refrigerant uniform before the compressor starts.
- During the test operation, the refrigerant running sound or the magnetic sound of a solenoid valve may become loud and the LED display may change, but these are not malfunctions.
- During the test operation, it is not possible to stop the unit operation from a remote controller. To abort the operation, press the **BS3 RETURN** button. The unit will stop after ±30 seconds.
  Test run may take up to 1 hour or more.

4 Close the front panel in order to let it not be the cause of misjudgement.

5 Check the test operation results by the LED display on the outdoor unit.

	H1P	H2P	H3P	H4P	H5P	H6P	H7P
Normal completion	●	●	☼	●	●	●	●
Abnormal completion	●	☼	☼	●	●	●	●

6 When the test operation is fully completed, normal operation will be possible after 5 minutes.

Otherwise, refer to "Correcting after abnormal completion of the test operation" on page 29 to take actions for correcting the abnormality.

Correcting after abnormal completion of the test operation

The test operation is only completed if there is no malfunction code displayed on the remote controller. In case of a displayed malfunction code, perform the following actions to correct the abnormality:

- Confirm the malfunction code on the remote controller

Installation error	Error code	Remedial action
The stop valve of an outdoor unit is left closed.	E3 E4 F3 F6 UF	Open the stop valve.
The phases of the power to the outdoor unit is reversed.	U1	Exchange two of the three phases (L1, L2, L3) to make a positive phase connection.
No power is supplied to an outdoor or indoor unit (including phase interruption).	LC U1 U4	Check if the power wiring for the outdoor unit is connected correctly.
Incorrect interconnections between units.	UF	Check if the refrigerant piping and the unit wiring are consistent with each other.
Refrigerant overcharge.	E3 F6 UF	Recalculate the required amount of refrigerant from the piping length and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
Insufficient refrigerant.	E4 F3	Check if the additional refrigerant charge has been finished correctly. Recalculate the required amount of refrigerant from the piping length and add an adequate amount of refrigerant.
In case the test operation was interrupted or the unit was operating out of the instructed temperature range, the initial refrigerant detection has failed.	U3	In case the the test operation was interrupted, perform the test operation again. Perform the test operation again within the instructed temperature range. Test run is possible for ambient temperatures between –20°C and 35°C.

- After correcting the abnormality, press the **BS3 RETURN** button and reset the malfunction code.
- Carry out the test operation again and confirm that the abnormality is properly corrected.
- Refer to the installation manual of the indoor unit for other detailed codes.

15. Operation of the unit

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

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

16. Maintenance and service

16.1. Maintenance introduction

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

This maintenance shall be carried out by the installer or service agent.

16.2. Service precautions

DANGER: ELECTRICAL SHOCK

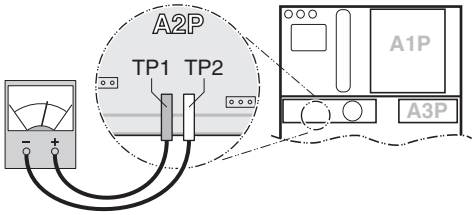
See "2. General Safety precautions" on page 2.

CAUTION

when performing service to inverter equipment

1. Do not open the electric component box cover for 10 minutes after the power supply is turned off.
2. Measure the voltage between terminals on the terminal block for power supply with a tester and confirm that the power supply is shut off.

   In addition, measure the points, as shown in the figure below, with a tester and confirm that the voltage of the capacitor in the main circuit is less than 50 V DC.



3. To prevent damaging the PC-board, touch a non-coated metal part to eliminate static electricity before pulling out or plugging in connectors.
4. Pull out junction connectors X1A, X2A, X3A, X4A (X3A and X4A of EMRQ14+16 are inside the electric component box (2), refer to the wiring diagram) for the fan motors in the outdoor unit before starting service operation on the inverter equipment. Be careful not to touch the live parts.

   (If a fan rotates due to strong wind, it may store electricity in the capacitor or in the main circuit and cause electric shock.)
5. After the service is finished, plug the junction connecter back in. Otherwise the error code E7 will be displayed on the remote controller and normal operation will not be performed.

For details refer to the wiring diagram labelled on the back of the electric component box cover.

Pay attention to the fan. It is dangerous to inspect the unit while the fan is running. Be sure to turn off the main switch and to remove the fuses from the control circuit located in the outdoor unit.

NOTE

Play it safe!

For protection of the PCB, touch the switch box casing by hand in order to eliminate static electricity from your body before performing service.

16.3. Service mode operation

Refrigerant recovery operation/vacuuming operation is possible by setting the unit in mode 2.

Refer to "Field settings by push buttons" on page 27 for details how to set mode 2.

When vacuuming/recovery mode is used, check very carefully what should be vacuumed/recovered before starting.

See installation manual of the indoor unit for more information about vacuuming and recovery.

Vacuum method

1 When the unit is at standstill, set the unit in mode 2 as follows:
Push the **BS1 MODE** button for 5 sec, the H1P LED is on ☼

2 Set the unit in mode 2-21:
Push the **BS2 SET** button 21 times until following LED combination is reached:

H1P	H2P	H3P	H4P	H5P	H6P	H7P
☼	●	☼	●	☼	●	☼

3 Push the **BS3 RETURN** button to confirm setting 2-21 above.

4 Push the **BS2 SET** button to change the charge mode from **OFF** (OFF) to **ON** (ON). LED indication should change as follows:

		H1P	H2P	H3P	H4P	H5P	H6P	H7P
OFF	(a)	☼	●	●	●	●	●	◑
ON		☼	●	●	●	●	◑	●

(a) This setting = factory setting

5 Push the **BS3 RETURN** button and the setting is defined.

6 Push the **BS3 RETURN** button again, to confirm this setting. When confirmed, the indoor and outdoor unit expansion valves will fully open. At that moment the H1P LED is **ON** (ON) and the remote controller of all indoor units indicate TEST (test operation) and ⚓ (external control) and the operation will be prohibited.

7 Evacuate the system with a vacuum pump.

8 Press **BS1 MODE** button and reset the setting mode 2.

Refrigerant recovery operation method

This should be done by a refrigerant reclaimer.

Follow the same procedure as for vacuuming method.

17. Caution for refrigerant leaks

17.1. Introduction

The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available.

This system uses R410A as refrigerant. R410A itself is an entirely safe non-toxic, non-combustible refrigerant. Nevertheless care must be taken to ensure that air conditioning facilities are installed in a room which is sufficiently large. This assures that the maximum concentration level of refrigerant gas is not exceeded, in the unlikely event of major leak in the system and this in accordance to the local applicable regulations and standards.

17.2. Maximum concentration level

The maximum charge of refrigerant and the calculation of the maximum concentration of refrigerant is directly related to the humanly occupied space in to which it could leak.

The unit of measurement of the concentration is kg/m^3 (the weight in kg of the refrigerant gas in 1 m^3 volume of the occupied space).

Compliance to the local applicable regulations and standards for the maximum allowable concentration level is required.

According to the appropriate European Standard, the maximum allowed concentration level of refrigerant to a humanly space for R410A is limited to 0.44 kg/m^3.

1 direction of the refrigerant flow

2 room where refrigerant leak has occurred (outflow of all the refrigerant from the system)

Pay special attention to places, such as a basements, etc. where refrigerant can stay, since refrigerant is heavier than air.

17.3. Procedure for checking maximum concentration

Check the maximum concentration level in accordance with steps 1 to 4 below and take whatever action is necessary to comply.

1 Calculate the amount of refrigerant (kg) charged to each system separately.

amount of refrigerant in a single unit system (amount of refrigerant with which the system is charged before leaving the factory) + additional charging amount (amount of refrigerant added locally in accordance with the length or diameter of the refrigerant piping) = total amount of refrigerant (kg) in the system

2 Calculate the volume of the room (m^3) where the indoor unit is installed.

3 Calculating the refrigerant density using the results of the calculations in steps 1 and 2 above.

$$\frac{\text{total volume of refrigerant in the refrigerant system}}{\text{size } (m^3) \text{ of room in which indoor unit is installed}} \leq \text{maximum concentration level } (kg/m^3)$$

If the result of the above calculation exceeds the maximum concentration level, a ventilation opening to the adjacent room shall be made.
Calculate the refrigerant density taking the volume of the room where the indoor unit is installed and the adjacent room.
Install ventilation openings in the door of adjacent rooms until the refrigerant density is smaller than the maximum concentration level.

18. Disposal requirements

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

19. Unit specifications

Technical specifications

EMRQ		8	10	12	14	16
Casing material		painted galvanised steel				
Dimensions (hxwxd)	(mm)	1680x1300x765				
Weight	(kg)	331	331	331	339	339
Operation range						
• Cooling (min./max.)	(°C)	10/43				
• Heating (min./max.)	(°C)	–20/20				
• Domestic hot water (min./max.)	(°C)	–20/35				
Refrigerant type		R410A				
Refrigerant oil		Daphne FVC68D				
Piping connection						
• Liquid	(mm)	9.52	9.52	12.7	12.7	12.7
• Suction	(mm)	19.1	22.2	28.6	28.6	28.6
• Discharge	(mm)	15.9	19.1	19.1	22.2	22.2

Electrical specifications

EMRQ		8	10	12	14	16
Phase		3N~				
Frequency	(Hz)	50				
Voltage	(V)	380~415				
Voltage range						
• Minimum	(V)	342				
• Maximum	(V)	440				
Recommended fuses	(A)	20	25	25	40	40

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4PW61262-1B 2013.11