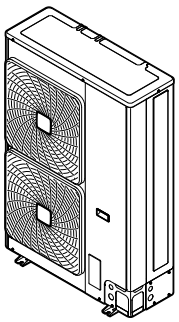
Installation and operation manual

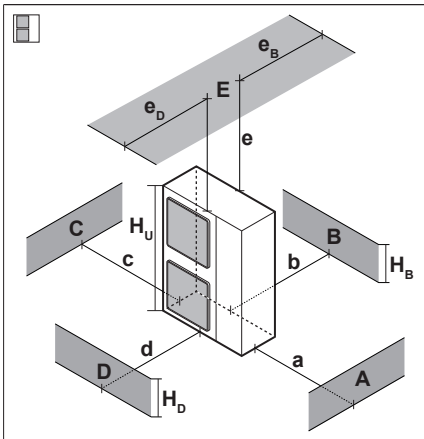
Air-cooled refrigeration condensing unit



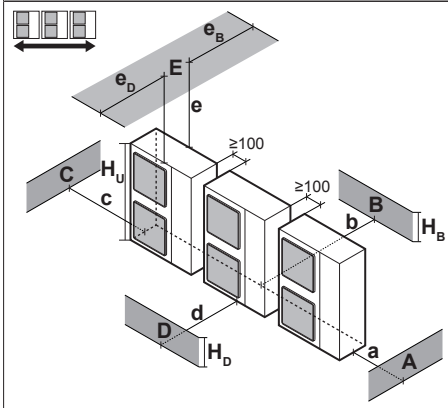
LRMEQ3AY1
LRMEQ4AY1

Installation and operation manual
Air-cooled refrigeration condensing unit

English

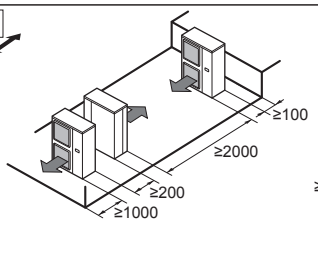


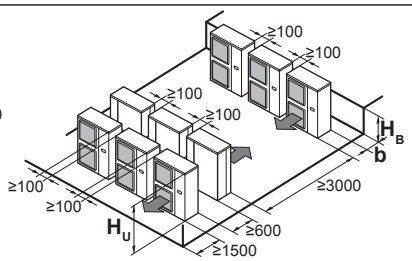
A~E	H_B H_D H_U		(mm)							
			a	b	c	d	e	e_B	e_D	
B	—			≥100						
A, B, C	—		≥100	≥100	≥100					
B, E	—			≥100			≥1000		≤500	
A, B, C, E	—		≥150	≥150	≥150		≥1000		≤500	
D	—					≥500				
D, E	—					≥1000	≥1000	≤500		
B, D	—			≥100		≥500				
B, D, E	H_B<H_D	H_B≤½H_U		≥250		≥750	≥1000	≤500		1
		½H_U<H_B≤H_U		≥250		≥1000	≥1000	≤500		
		H_B>H_U	⊘							
	H_B>H_D	H_D≤½H_U		≥100		≥1000	≥1000		≤500	
		½H_U<H_D≤H_U		≥200		≥1000	≥1000		≤500	
		H_D>H_U		≥200		≥1700	≥1000		≤500	



A, B, C	—		≥200	≥300	≥1000					
A, B, C, E	—		≥200	≥300	≥1000		≥1000		≤500	
D	—					≥1000				
D, E	—					≥1000	≥1000	≤500		
B, D	H_D>H_U			≥300		≥1000				
	H_D≤½H_U			≥250		≥1500				
	½H_U<H_D≤H_U			≥300		≥1500				
B, D, E	H_B<H_D	H_B≤½H_U		≥300		≥1000	≥1000	≤500		1+2
		½H_U<H_B≤H_U		≥300		≥1250	≥1000	≤500		
		H_B>H_U	⊘							
	H_B>H_D	H_D≤½H_U		≥250		≥1500	≥1000		≤500	
		½H_U<H_D≤H_U		≥300		≥1500	≥1000		≤500	
		H_D>H_U		≥300		≥2200	≥1000		≤500	

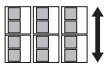
1



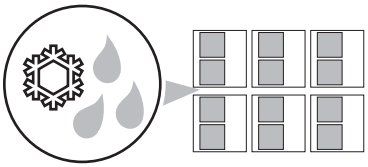


H_B H_U	b (mm)
H_B≤½H_U	b≥250
½H_U<H_B≤H_U	b≥300
H_B>H_U	⊘

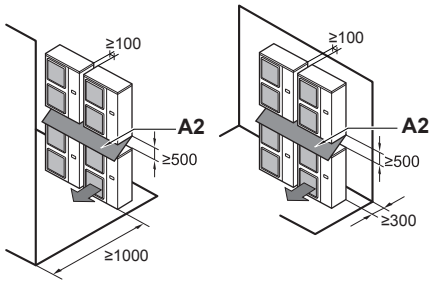
2



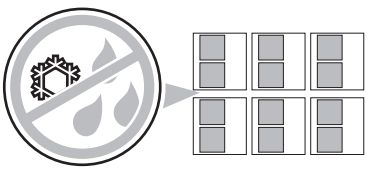
A1



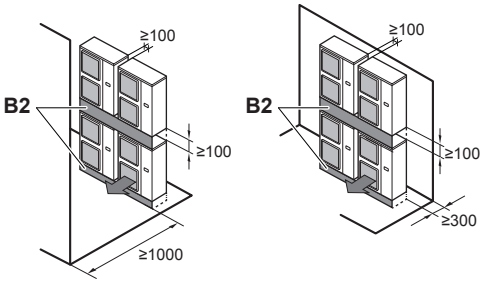
A2



B1



B2



3

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

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

CE - DECLARAÇÃO-DE-CONFORMIDADE
CE - ЗАЯВЛЕНИЕ-О-СООТВЕТСТВИИ
CE - OVERENSSTEMMELSESERKLÆRING
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 - UYGUNLUK-BEYANI

Daikin Europe N.V.

01 (GB) declares under its sole responsibility that the air conditioning models to which this declaration relates:
02 (D) erklärt auf seine alleinige Verantwortung daß die Modelle der Klimageräte für die diese Erklärung bestimmt ist:
03 (F) déclare sous sa seule responsabilité que les appareils d'air conditionné visés par la présente déclaration:
04 (NL) verklaart hierbij op eigen exclusieve verantwoordelijkheid dat de airconditioning units waarop deze verklaring betrekking heeft:
05 (E) declara baja su única responsabilidad que los modelos de aire acondicionado a los cuales hace referencia la declaración:
06 (I) dichiara sotto sua responsabilità che i condizionatori modello a cui è riferita questa dichiarazione:
07 (GR) δηλώνει με αποκλειστική της ευθύνη ότι τα μοντέλα των κλιματιστικών συσκευών στα οποία αναφέρεται η παρούσα δήλωση:
08 (P) declara sob sua exclusiva responsabilidade que os modelos de ar condicionado a que esta declaração se refere:
09 (RUS) заявляет, исключительно под свою ответственность, что модели кондиционеров воздуха, к которым относится настоящее заявление:
10 (DK) erklærer under eneansvar, at klimaanlægmodellerne, som denne deklaration vedrører:
11 (S) deklarerar i egenskap av huvudansvarig, att luftkonditioneringsmodellerna som berörs av denna deklaration innebär att:
12 (N) erklærer et fullstendig ansvar for at de luftkondisjoneringsmodeller som berøres av denne deklarasjon, innebærer at:
13 (FIN) ilmoittaa yksinomaan omalla vastuullaan, että tämän ilmoituksen tarkoittamat ilmastointilaitteiden mallit:
14 (CZ) prohlašuje ve své plné odpovědnosti, že modely klimatizace, k nimž se toto prohlášení vztahuje:
15 (GR) izjavljuje pod isključivo vlastitom odgovornošću da su modeli klima uređaja na koje se ova izjava odnosi:
16 (H) teljes felelősségе tudatában kijelenti, hogy a klímaberendezés modellek, melyekre e nyilatkozat vonatkozik:
17 (PL) deklaruje na własną i wyłączną odpowiedzialność, że modele klimatyzatorów, których dotyczy niniejsza deklaracja:
18 (RO) declară pe proprie răspundere că aparatele de aer conditionat la care se referă această declarație:
19 (SLO) z vso odgovornostjo izjavlja, da so modeli klimatskih naprav, na katere se izjava nanaša:
20 (EST) kinnitab oma täielikul vastutusel, et käesoleva deklaratsiooni alla kuuluvad kliimaseadmete mudelid:
21 (BG) декларира на своя отговорност, че моделите климатична инсталация, за които се отнася тази декларация:
22 (LT) visiška savo atsakomybe skelbia, kad oro kondicionavimo prietaisų modeliai, kuriems yra taikoma ši deklaracija:
23 (LV) ar pilnu atbildību apliecina, ka tālāk uzskaitīto modeļu gaisa kondicionētāji, uz kuriem attiecas šī deklarācija:
24 (SK) vyhlasuje na vlastnú zodpovednosť, že tieto klimatizačné modely, na ktoré sa vzťahuje toto vyhlásenie:
25 (TR) tamamen kendi sorumluluğunda olmak üzere bu bildirinin ilgili olduğu klima modellerinin aşağıdaki gibi olduğunu beyan eder:

LRMEQ3AY1*, LRMEQ4AY1*,

* = , , 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 forutsetning 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 condiția ca acestea să fie utilizate în conformitate cu instrucțiunile 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 съгласно клаузите на:
22 laikantis nuostatų, pateikiamų:
23 ievērojot prasības, kas noteiktas:
24 održiavajúc ustanovenia:
25 bunun koşullarına uygun olarak:

Machinery 2006/42/EC **
Electromagnetic Compatibility 2014/30/EU *

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
14 muutettuina.
15 v platném znění.
16 Smjernice, kako je izmijenjeno.
17 irányelv(ek) és módosításaik rendelkezéseit.
18 Directivelor, cu amendamentele respective.
19 Direktive z vsemi spremembami.
20 Direktiivid koos muudatustega.
21 Директиви, с техните изменения.
22 Direktyvose su papildymais.
23 Direktīvās un to papildinājumos.
24 Smernice, v platnom znení.
25 Değiştirilmiş halleriyle Yönetmelikler.

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

<A>	DAIKIN.TCF.023C18/02-2016
<B>	TÜV (NB1856)
<C>	502240101

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02** Daikin Europe N.V. hat die Berechtigung die Technische Konstruktionsakte zusammenzustellen.
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.
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13** Daikin Europe N.V. on valtuutettu laatimaan Teknisen asiakirjan.
14** Společnost Daikin Europe N.V. má oprávnění ke kompilaci souboru technické konstrukce.
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.
18** Daikin Europe N.V. este autorizat să compileze Dosarul tehnic de construcţie.
19** Daikin Europe N.V. je pooblaščen za sestavo datoteke s tehnično mapo.
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.

3P441337-1

DAIKIN

Shigeki Morita
Director
Ostend, 1st of April, 2016

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

Table of Contents

1 About the documentation

1.1 About this document

Target audience

Authorised installers + end users

INFORMATION

This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.

Documentation set

This document is part of a documentation set. The complete set consists of:

- **General safety precautions:**
  - Safety instructions that you must read before installing
  - Format: Paper (in the box of the outdoor unit)
- **Outdoor unit installation and operation manual:**
  - Installation and operation instructions
  - Format: Paper (in the box of the outdoor unit)
- **Installer and user reference guide:**
  - Preparation of the installation, technical specifications, reference data,…
  - Detailed step-by-step instructions and background information for basic and advanced usage
  - Format: Digital files on http://www.daikineurope.com/support-and-manuals/product-information/

Latest revisions of the supplied documentation may be available on the regional Daikin website or via your dealer.

The original documentation is written in English. All other languages are translations.

For the installer

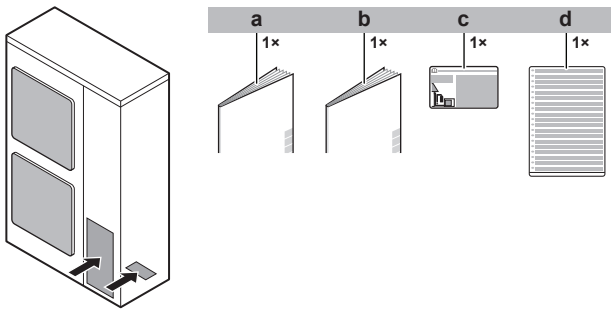
2 About the box

2.1 Outdoor unit

2.1.1 To remove the accessories from the outdoor unit

1 Remove the service cover. See "5.1.1 To open the outdoor unit" on page 7.

2 Remove the accessories.



a General safety precautions
b Outdoor unit installation and operation manual
c Fluorinated greenhouse gases label
d Multilingual fluorinated greenhouse gases label

3 About the units

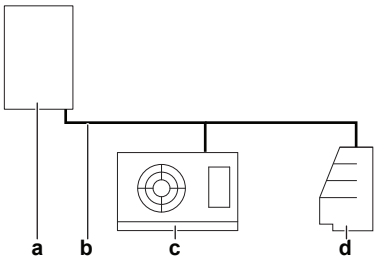
3.1 About the outdoor unit

This installation manual concerns the ZEAS condensing unit.

This unit is intended for outdoor installation and aimed for air to air cooling applications.

Specification	LRMEQ3+4
Capacity (cooling)	5.90~8.40 kW
Ambient design temperature (cooling)	–10~43°C DB

3.2 System layout



a Outdoor unit (ZEAS condensing unit)
b Refrigerant piping
c Indoor unit (Blower coil)
d Indoor unit (Showcase)

3.3 About the indoor units

NOTICE

To be sure your system setup (outdoor unit+indoor unit(s)) will work, you have to consult the latest technical engineering data for ZEAS condensing unit.

The ZEAS condensing unit can be combined with several types of third party indoor units and is intended for R410A use only.

When installing indoor units, mind the following:

- **Expansion valve**. Install an R410A mechanical thermostatic expansion valve on each indoor unit. Insulate the feeler block of the mechanical thermostatic expansion valve.
- **Solenoid valve**. Install an R410A solenoid valve (with an operating differential pressure of 3.5 MPa [35 bar] or more) on the primary side of the mechanical thermostatic expansion valve for each indoor unit.
- **Filter**. Install a filter on the primary side of the solenoid valve for each indoor unit. Determine the filter mesh count based on the size specified by the solenoid valve and the mechanical thermostatic expansion valve being used.
- **Refrigerant flow**. Route the path to the indoor unit heat exchanger so that the refrigerant flow is from top to bottom.
- **Multiple indoor units**. When installing multiple indoor units, install them at the same level. A combination of showcases and blower coils is allowed if they are installed on the same floor.
- **Defrosting type**. Use either off-cycle defrosting or electric heater defrosting models. Do NOT use hot-gas defrosting models.

3.3.1 About reusing existing indoor heat exchangers

In some cases you may reuse existing indoor heat exchangers, in other cases not.

Reuse not allowed

You may not reuse existing indoor heat exchangers in the following cases:

- When the design pressure is insufficient. (minimum design pressure = 2.5 MPa [25 bar])
- When the path to the heat exchanger has been routed so that the flow of refrigerant is from bottom to top.
- When the copper piping or fan is corroded.
- When the heat exchanger is contaminated. Foreign materials (including oils for fabrication) must be ≤30 mg/10 m.

Reuse allowed

In other cases than above, you may reuse existing indoor heat exchangers. However, if the old condensing unit did NOT use the same refrigerant (R410A) and the same oil (FVC68D) as the new one, you must clean the heat exchanger tubes to remove any residue.

If the old condensing unit did NOT use the same refrigerant (R410A) as the new one, make sure the mechanical thermostatic expansion valve is compatible with R410A.

4 Preparation

4.1 Preparing installation site

4.1.1 Installation site requirements of the outdoor unit

Mind the spacing guidelines. See the "Technical data" chapter, and the figures on the inside of the front cover.

NOTICE

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.

4.2 Preparing refrigerant piping

4.2.1 About reusing existing piping

In some cases you may reuse existing piping, in other cases not.

Reuse not allowed

You may not reuse existing piping in the following cases:

- When the compressor in the old installation had problems (example: breakdown). **Possible consequence:** oxidised coolant oil, scale residue and other adverse effects.
- When the indoor and outdoor units were disconnected from the piping for a long time. **Possible consequence:** water and dirt in the piping.
- When the copper piping is corroded.

Reuse allowed

In other cases than above, you may reuse existing piping but keep the following in mind:

Item	Description
Piping diameter	Must comply with requirements. See "4.2.2 Refrigerant piping requirements" on page 6.
Piping material	
Piping length and height difference	
Piping insulation	If deteriorated, must be replaced. Must comply with requirements. See "5.5 To insulate the refrigerant piping" on page 12.
Flare connections	May not be reused. Make new ones to prevent leaks. See "5.3.1 Guidelines when connecting the refrigerant piping" on page 8 and "5.3.2 To flare the pipe end" on page 9.
Welded connections	Must be checked for gas leaks.
Cleaning piping	If the old condensing unit did NOT use the same refrigerant (R410A) and the same oil (FVC68D) as the new one, you must clean the piping to remove any residue.

4.2.2 Refrigerant piping requirements

NOTICE

Refrigerant R410A requires strict cautions for keeping the system clean and dry. Foreign materials (including mineral oils or moisture) should be prevented from getting mixed into the system.

NOTICE

The piping and other pressure-containing parts 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.

4.2.3 Refrigerant piping material

- **Piping material:** Phosphoric acid deoxidised seamless copper.
- **Piping temper grade and thickness:**

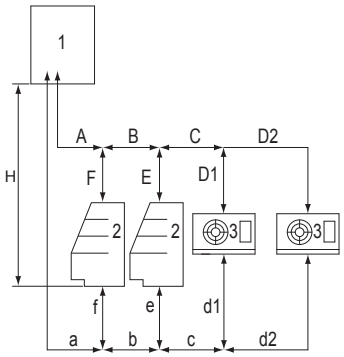
Outer diameter (Ø)	Temper grade	Thickness (t)[(a)]	
6.4 mm (1/4") 9.5 mm (3/8") 12.7 mm (1/2")	Annealed (O)	≥0.80 mm	
15.9 mm (5/8")	Annealed (O)	≥0.99 mm	

(a) Depending on the applicable legislation and the unit's maximum working pressure (see "PS High" on the unit name plate), larger piping thickness might be required.

- **Flare connections:** Only use annealed material.

4.2.4 To select the piping size

Determine the proper size referring to following tables and reference figure (only for indication).



1 Outdoor unit
2 Indoor unit (Showcase)
3 Indoor unit (Blower coil)
A~F Liquid piping
a~f Gas piping
H Height difference outdoor-indoor

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).
- The additional refrigerant calculation has to be adjusted as mentioned in "5.6.2 To determine the additional refrigerant amount" on page 12.

A/a: Piping between outdoor unit and piping branching

Use the same diameters as the connections on the outdoor units:

Liquid piping	Ø9.5 mm
Gas piping	Ø15.9 mm

B+C/b+c: Piping between piping branching

Use diameters depending on the total capacity of the indoor units connected downstream.

	Capacity	Piping outer diameter
Liquid piping	<4.0 kW	Ø6.4 mm
	4.0≤x<8.4 kW	Ø9.5 mm
Gas piping	<1.0 kW	Ø9.5 mm
	1.0≤x<6.0 kW	Ø12.7 mm
	6.0≤x<8.4 kW	Ø15.9 mm

D~F/d~f: Piping between piping branching and indoor unit

Use the same diameters as the connections (liquid, gas) on the indoor units.

NOTICE

If only 1 indoor unit is connected to the outdoor unit, and the connections on the outdoor unit are different from those on the indoor unit, then use the same piping diameter as the connections on the outdoor unit, and install suitable adapters as near to the indoor unit as possible.

4.3 Preparing electrical wiring

4.3.1 Safety device requirements

Power supply

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.

Model	Minimum circuit ampacity	Recommended fuses	Power supply
LRMEQ3+4	13.5 A	16 A	3N~ 50 Hz 380-415 V

Operation switch, low-noise switch and error output wiring

NOTICE

Operation switch. An operation switch is required to turn outdoor unit operation ON/OFF. The outdoor unit cannot operate without it. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC).

NOTICE

Low-noise switch. If you want to remotely turn ON/OFF low-noise operation (see setting [2-25]), you must install a low-noise switch. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC).

NOTICE

Error output. If system malfunctions are likely to degrade the articles in the room/showcase, you can install an alarm (example: lamp). If a malfunction occurs, a signal (220-240 V AC) is given to the error output (X2M/E1/E2). Use an alarm with a maximum load of 0.5 A.

Wiring	Sheathed + shielded cable (2 wires) Vinyl cords 0.75~1.25 mm²
Maximum wiring length	130 m

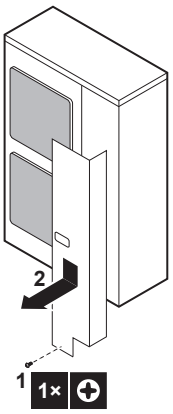
5 Installation

5.1 Opening the units

5.1.1 To open the outdoor unit

DANGER: RISK OF ELECTROCUTION

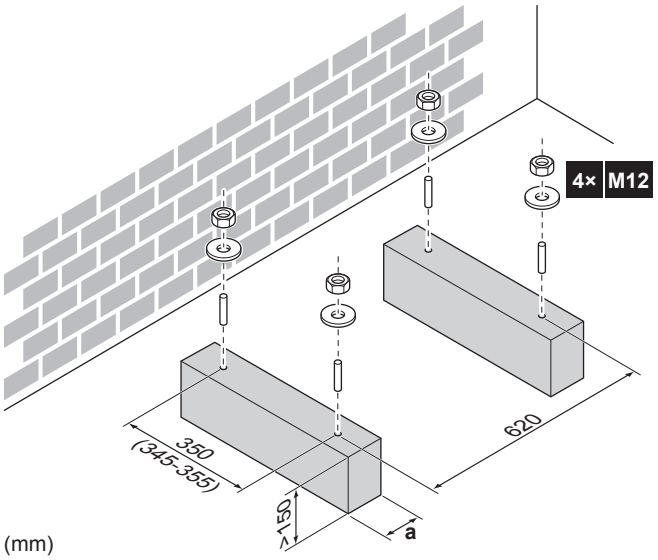
DANGER: RISK OF BURNING



5.2 Mounting the outdoor unit

5.2.1 To provide the installation structure

Prepare 4 sets of anchor bolts, nuts and washers (field supply) as follows:

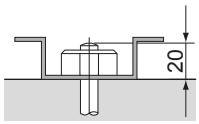


(mm)

a Make sure not to cover the drain holes.

INFORMATION

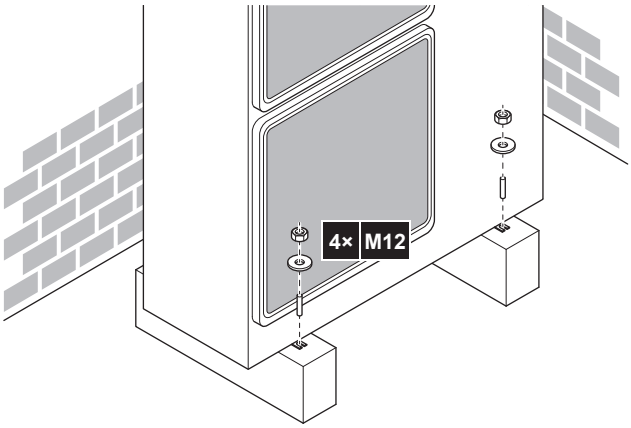
The recommended height of the upper protruding part of the bolts is 20 mm.



NOTICE

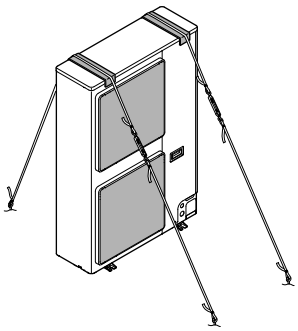
Fix the outdoor unit to the foundation bolts using nuts with resin washers (a). If the coating on the fastening area is stripped off, the nuts rust easily.

5.2.2 To install the outdoor unit



5.2.3 To prevent the outdoor unit from falling over

1. Prepare 2 cables as indicated in the following illustration (field supply).
2. Place the 2 cables over the outdoor unit.
3. Insert a rubber sheet between the cables and the outdoor unit to prevent the cable from scratching the paint (field supply).
4. Attach the cable's ends. Tighten those ends.



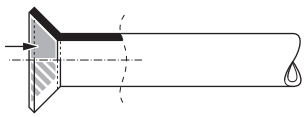
5.3 Connecting the refrigerant piping

DANGER: RISK OF BURNING

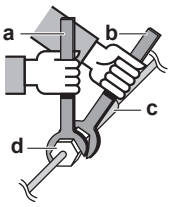
5.3.1 Guidelines when connecting the refrigerant piping

Take the following guidelines into account when connecting pipes:

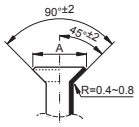
- Coat the flare inner surface with ether oil or ester oil when connecting a flare nut. Tighten 3 or 4 turns by hand, before tightening firmly.



- Always use two wrenches together when loosening a flare nut.
- Always use a spanner and torque wrench together to tighten the flare nut when connecting the piping. This to prevent nut cracking and leaks.



a Torque wrench
b Spanner
c Piping union
d Flare nut

Piping size (mm)	Tightening torque (N•m)	Flare dimensions (A) (mm)	Flare shape (mm)
Ø6.4	15~17	8.7~9.1	
Ø9.5	33~39	12.8~13.2	
Ø12.7	50~60	16.2~16.6	
Ø15.9	63~75	19.3~19.7	

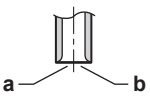
5.3.2 To flare the pipe end

CAUTION

- Incomplete flaring may cause refrigerant gas leakage.
- Do NOT re-use flares. Use new flares to prevent refrigerant gas leakage.
- Use flare nuts that are included with the unit. Using different flare nuts may cause refrigerant gas leakage.

1 Cut the pipe end with a pipe cutter.

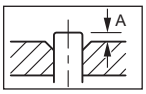
2 Remove burrs with the cut surface facing downward so that the chips do not enter the pipe.



a Cut exactly at right angles.
b Remove burrs.

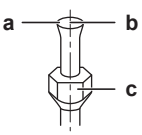
3 Remove the flare nut from the stop valve and put the flare nut on the pipe.

4 Flare the pipe. Set exactly at the position as shown in the following illustration.



		Conventional flare tool	
	Flare tool for R410A (clutch type)	Clutch type (Ridgid-type)	Wing nut type (Imperial-type)
A	0~0.5 mm	1.0~1.5 mm	1.5~2.0 mm

5 Check that the flaring is properly made.



a Flare's inner surface must be flawless.
b The pipe end must be evenly flared in a perfect circle.
c Make sure the flare nut is fitted.

5.3.3 Using the stop valve and service port

To handle the stop valve

- Make sure to keep all stop valves open during operation.
- The stop valve is factory closed.

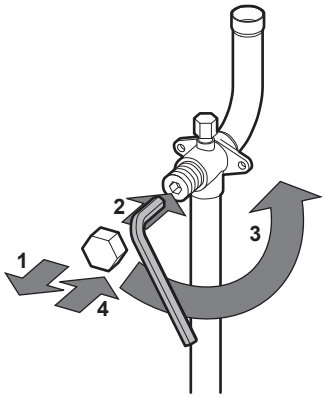
To open the stop valve

1 Remove the stop valve cover.

2 Insert a hexagon wrench into the stop valve and turn the stop valve counterclockwise.

3 When the stop valve cannot be turned any further, stop turning.

Result: The valve is now open.



To close the stop valve

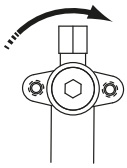
1 Remove the stop valve cover.

2 Insert a hexagon wrench into the stop valve and turn the stop valve clockwise.

3 When the stop valve cannot be turned any further, stop turning.

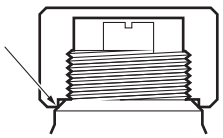
Result: The valve is now closed.

Closing direction:



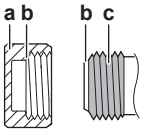
To handle the stop valve cover

- 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.



NOTICE

Thread-locking fluid. Before reattaching the stop valve cover, apply thread-locking fluid to the screw thread (NOT to the cover or sealing part). Otherwise, condensation water might enter and freeze. **Possible consequence:** Deformation, refrigerant leakage and compressor malfunction.



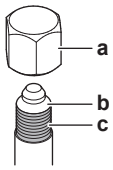
a Cover (do NOT apply thread-locking fluid)
b Sealing part (do NOT apply thread-locking fluid)
c Screw thread with thread-locking fluid

To handle 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.

NOTICE

Thread-locking fluid. Before reattaching the service port cover, apply thread-locking fluid to the screw thread (NOT to the cover or sealing part) . Otherwise, condensation water might enter and freeze. **Possible consequence:** Deformation, refrigerant leakage and compressor malfunction.



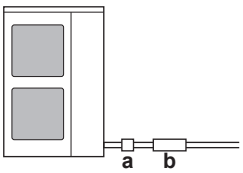
a Cover (do NOT apply thread-locking fluid)
b Sealing part (do NOT apply thread-locking fluid)
c Screw thread with thread-locking fluid

Tightening torques

Stop valve size (mm)	Tightening torque N•m (turn clockwise to close)			
	Shaft			
	Valve body	Hexagonal wrench	Cap (valve lid)	Service port
Ø9.5	5.4~6.6	4 mm	13.5~16.5	11.5~13.9
Ø15.9	13.5~16.5	6 mm	22.5~27.5	

5.3.4 Guidelines when installing a sight glass

Install a sight glass on the liquid piping:

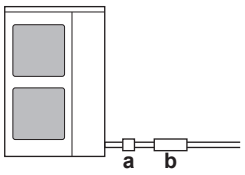
Diameter	9.5 mm
Where/how	Install the sight glass before the dryer, as near to the outdoor unit as possible. Install horizontally.  **a** Sight glass **b** Dryer
When brazing	Follow the brazing instructions in the sight glass manual.

5.3.5 Guidelines when installing a dryer

NOTICE

Do NOT operate the unit without a dryer installed. **Possible consequence:** Equipment malfunction.

Install a dryer on the liquid piping:

Dryer type	80 g (100% molecular sieve equivalent) (DML083/DML083S: Danfoss made)
Where/how	Install the dryer after the sight glass, as near to the outdoor unit as possible. Install horizontally.  **a** Sight glass **b** Dryer
When brazing	Follow the brazing instructions in the dryer manual. Remove the dryer cap immediately before brazing (to prevent absorption of airborne moisture). If dryer paint burnt during brazing, repair it. For repair paint details, contact the manufacturer.
Flow direction	If the dryer specifies a flow direction, install accordingly.

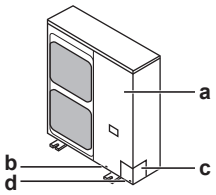
5.3.6 To connect the refrigerant piping to the outdoor unit

NOTICE

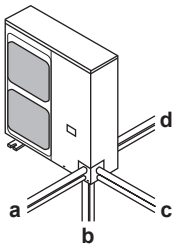
Be sure that the field installed piping does not touch other pipes, the bottom panel or side panel. Especially for the bottom and side connection, be sure to protect the piping with suitable insulation, to prevent it from coming into contact with the casing.

1 Do the following:

- Remove the service cover (a) with screw (b).
- Remove the piping intake plate (c) with screw (d).

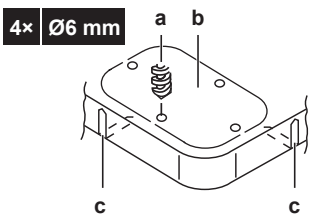


2 Choose a piping route (a, b, c or d).



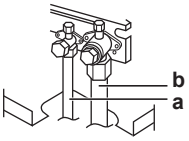
3 If you have chosen the downwards piping route:

- Drill (a, 4×) and remove the knockout hole (b).
- Cut out the slits (c) with a metal saw.



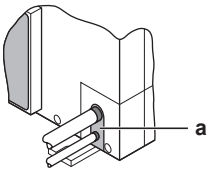
4 Do the following:

- Connect the liquid pipe (a) to the liquid stop valve.
- Connect the gas pipe (b) to the gas stop valve.



5 Reattach the service cover and the piping intake plate.

6 Seal all gaps (example: a) to prevent snow and small animals from entering the system.



WARNING

Provide adequate measures to prevent that the unit can be used as a shelter by small animals. Small animals that make contact with electrical parts can cause malfunctions, smoke or fire.

NOTICE

Make sure to open the stop valves after installing the refrigerant piping and performing vacuum drying. Running the system with the stop valves closed may break the compressor.

5.4 Checking the refrigerant piping

5.4.1 About checking the refrigerant piping

Checking the refrigerant piping involves:

- Checking for any leakages in the refrigerant piping.
- Performing vacuum drying to remove all moisture, air or nitrogen in the refrigerant piping.

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

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.

NOTICE

Make sure that all (field supplied) field piping valves are OPEN (not outdoor unit stop valves!) before you start leak test and vacuuming.

For more information on the state of the valves, refer to "5.4.3 Checking refrigerant piping: Setup" on page 11.

5.4.2 Checking refrigerant piping: General guidelines

Connect the vacuum pump through a manifold to the service port of all stop valves to increase efficiency (refer to "5.4.3 Checking refrigerant piping: Setup" on page 11).

NOTICE

Use a 2-stage vacuum pump with a non-return valve or a solenoid valve that can evacuate to a gauge pressure of –100.7 kPa (5 Torr absolute).

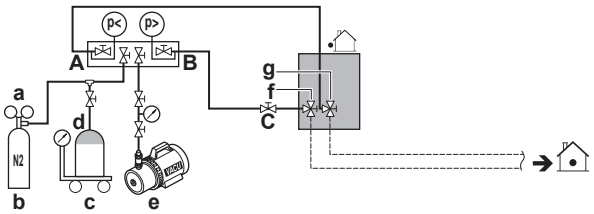
NOTICE

Make sure the pump oil does not flow oppositely into the system while the pump is not working.

NOTICE

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

5.4.3 Checking refrigerant piping: Setup



a Pressure reducing valve
b Nitrogen
c Weighing scales
d Refrigerant R410A tank (siphon system)
e Vacuum pump
f Liquid line stop valve
g Gas line stop valve
A Valve A
B Valve B
C Valve C

Valve	State of valve
Valve A	Open
Valve B	Open
Valve C	Open
Liquid line stop valve	Close
Gas line stop valve	Close

NOTICE

Indoor units should also be leak and vacuum tested. Keep any possible (field supplied) field piping valves open as well.

5.4.4 To perform a leak test

The leak test must satisfy the specifications of EN378-2.

To check for leaks: Vacuum leak test

1 Evacuate the system from the liquid and gas piping to –100.7 kPa (–1.007 bar/5 Torr) for more than 2 hours.

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

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

To check for leaks: Pressure leak test

1 Break the vacuum by pressurising with nitrogen gas to a minimum gauge pressure of 0.2 MPa (2 bar).

- Never set the gauge pressure of the **high pressure section** of the system higher than the maximum operation pressure of 4.0 MPa (40 bar).
- Never set the gauge pressure of the **low pressure section** of the system higher than the design pressure of the indoor unit.

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

3 Discharge all nitrogen gas.

NOTICE

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).

5.4.5 To perform 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 (–1.007 bar/5 Torr).
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. In that case, break the vacuum by pressurising 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.
4. Depending on whether you want to immediately charge refrigerant through the refrigerant charge port or first pre-charge a portion of refrigerant through the liquid line, either open the outdoor unit stop valves, or keep them closed. See "5.6.3 To charge refrigerant" on page 13 for more information.

5.5 To insulate the refrigerant piping

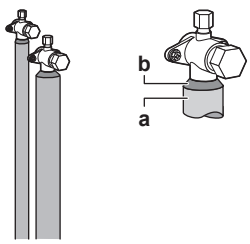
After finishing the leak test and vacuum drying, the piping must be insulated. Take into account the following points:

- Make sure to insulate the connection piping and refrigerant piping branching entirely.
- Be sure to insulate the liquid and gas 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.
- Take the following into account when determining the insulation thickness:

Liquid pipe minimum temperature	20°C
Gas pipe minimum temperature	–10°C

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 figure.



a Insulation material
b Caulking etc.

5.6 Charging refrigerant

5.6.1 Precautions when charging refrigerant

WARNING

- Only use R410A as refrigerant. Other substances may cause explosions and accidents.
- R410A contains fluorinated greenhouse gases. Its global warming potential (GWP) value is 2087.5. Do NOT vent these gases into the atmosphere.
- When charging refrigerant, always use protective gloves and safety glasses.

NOTICE

If the power of some units is turned off, the charging procedure cannot be finished properly.

NOTICE

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.

NOTICE

Before starting charging procedures, check if the 7-LEDs display is as normal (see "6.1.4 To access mode 1 or 2" on page 17). If a malfunction code is present, see "8.1 Solving problems based on error codes" on page 21.

NOTICE

Close the front panel before any refrigerant charge operation is executed. Without the front panel attached the unit cannot judge correctly whether it is operating properly or not.

NOTICE

In case of maintenance and the system (outdoor unit+field piping+indoor units) does not contain any refrigerant any more (e.g., after refrigerant reclaim operation), the unit has to be charged with its original amount of refrigerant (refer to the nameplate on the unit) and the determined additional refrigerant amount.

5.6.2 To determine the additional refrigerant amount

INFORMATION

For final charge adjustment in a test laboratory, contact your dealer.

Additional refrigerant to be charged=R (kg). R should be rounded off in units of 0.1 kg.

$R=[(X_1\times\mathbf{Ø9.5})\times0.059+(X_2\times\mathbf{Ø6.4})\times0.022]+A1+A2$

$X_{1...2}$=Total length (m) of liquid piping size at **Øa**

Parameter A1:

If the total capacity[(a)] of showcases is...	Then A1 is...
<5.0 kW	1.1 kg
5.0≤x<8.4 kW	2.3 kg

(a) Capacity at evaporating temperature of –10°C

Parameter A2:

If the total capacity[(a)] of blower coils is...	Then A2 is...
<5.0 kW	0.6 kg
5.0≤x<8.4 kW	1.2 kg

(a) Capacity at temperature difference (= evaporating temperature – room temperature) of 10°C

Metric piping. When using metric piping, please take into account following table concerning the weight factor to be allocated. It should be substituted in the formula for R.

Inch piping		Metric piping	
Size (Ø) (mm)	**Weight factor**	**Size (Ø) (mm)**	**Weight factor**
6.4	0.022	6	0.018
9.5	0.059	10	0.065

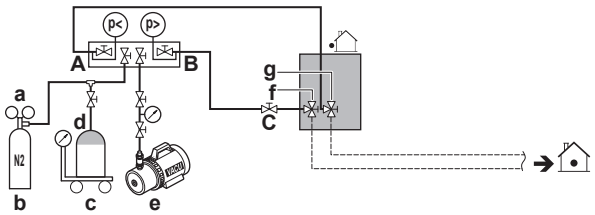
5.6.3 To charge refrigerant

To speed up the refrigerant charging process, it is recommended to first pre-charge a portion of refrigerant through the liquid line before proceeding with the charging via the refrigerant charging port. It can be skipped, but charging will take longer then.

Pre-charging refrigerant

Pre-charging can be done without compressor operation, by connecting the refrigerant bottle to the service port of the liquid stop valve.

1 Connect as shown. Make sure that all outdoor unit stop valves, as well as valve A are closed.



a Pressure reducing valve
b Nitrogen
c Weighing scales
d Refrigerant R410A tank (siphon system)
e Vacuum pump
f Liquid line stop valve
g Gas line stop valve
A Valve A
B Valve B
C Valve C

2 Open valves C and B.

3 Pre-charge refrigerant until the determined additional refrigerant amount is reached or pre-charging is not possible anymore, and then close valves C and B.

4 Do one of the following:

If	Then
The determined additional refrigerant amount is **reached**	Disconnect the manifold from the liquid line. Continue with the **"Checking the sight glass"** instructions.
Too much refrigerant is charged	Recover refrigerant. Disconnect the manifold from the liquid line. Continue with the **"Checking the sight glass"** instructions.
The determined additional refrigerant amount is **not reached** yet	Disconnect the manifold from the liquid line. Continue with the **"Charging refrigerant (via the refrigerant charging port)"** instructions.

Checking the sight glass

If the determined additional refrigerant amount is **reached by the "Pre-charging refrigerant" instructions**, continue as follows:

5 Open all outdoor unit stop valves.

6 Take all the precautions mentioned in "6 Configuration" on page 16 and "7 Commissioning" on page 19 into account.

7 Turn on the power of the outdoor unit, but leave the external operation switch turned off (see "5.7.4 To connect the electrical wiring on the outdoor unit" on page 15).

8 Set the target evaporating temperature with setting [2-8] (see "6.1.8 Mode 2: Field settings" on page 18).

9 Turn on the power of the indoor units.

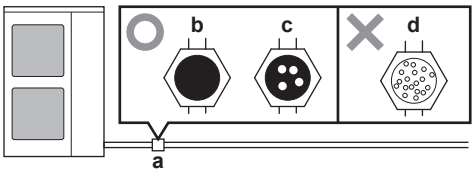
10 Turn on the external operation switch.

Result: The unit will start operation.

INFORMATION

- When a malfunction is detected during the procedure (e.g., in case of closed stop valve), a malfunction code will be displayed. In that case, refer to "5.6.4 Error codes when charging refrigerant" on page 14 and solve the malfunction accordingly.
- Aborting the manual refrigerant charge is possible by turning OFF the external operation switch. The unit will stop and return to idle condition.

11 Check the sight glass of the outdoor unit. If the refrigerant is NOT in sealing state, charge extra refrigerant as described in the **"Charging refrigerant (via the refrigerant charging port)"** instructions, but do NOT exceed 10% of the determined additional refrigerant amount (see "5.6.2 To determine the additional refrigerant amount" on page 12).



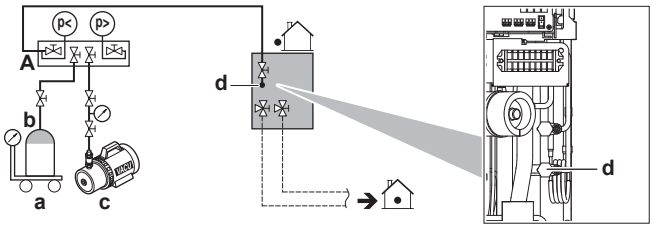
O Sealing state (= sufficient refrigerant)
X Insufficient refrigerant
a Sight glass
b Full of liquid
c A little foam in the liquid
d A lot of foam in the liquid

12 Turn off the external operation switch.

Charging refrigerant (via the refrigerant charging port)

The remaining additional refrigerant charge can be charged by operating the outdoor unit.

13 Connect as shown. Make sure valve A is closed.



a Weighing scales
b Refrigerant R410A tank (siphon system)
c Vacuum pump
d Refrigerant charge port
A Valve A

NOTICE

The refrigerant charging port is connected to the piping inside the unit. The unit's internal piping is already factory charged with refrigerant, so be careful when connecting the charge hose.

14 Open all outdoor unit stop valves. At this point, valve A must remain closed!

15 Take all the precautions mentioned in "6 Configuration" on page 16 and "7 Commissioning" on page 19 into account.

16 Turn on the power of the outdoor unit, but leave the external operation switch turned off (see "5.7.4 To connect the electrical wiring on the outdoor unit" on page 15).

17 Set the target evaporating temperature with setting [2-8] (see "6.1.8 Mode 2: Field settings" on page 18).

18 Turn on the power of the indoor units.

19 Turn on the external operation switch.

Result: The unit will start operation.

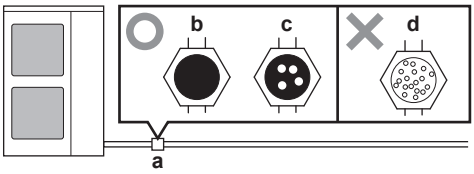
INFORMATION

- When a malfunction is detected during the procedure (e.g., in case of closed stop valve), a malfunction code will be displayed. In that case, refer to "5.6.4 Error codes when charging refrigerant" on page 14 and solve the malfunction accordingly.
- Aborting the manual refrigerant charge is possible by turning OFF the external operation switch. The unit will stop and return to idle condition.

20 Open valve A.

21 Charge refrigerant until the remaining determined additional refrigerant amount is added (see "5.6.2 To determine the additional refrigerant amount" on page 12), and then close valve A.

22 Check the sight glass of the outdoor unit. If the refrigerant is NOT in sealing state, charge extra refrigerant, but do NOT exceed 10% of the determined additional refrigerant amount (see "5.6.2 To determine the additional refrigerant amount" on page 12).



O Sealing state (= sufficient refrigerant)
X Insufficient refrigerant
a Sight glass
b Full of liquid
c A little foam in the liquid
d A lot of foam in the liquid

23 Turn off the external operation switch.

NOTICE

Make sure to open all stop valves after (pre-) charging the refrigerant.

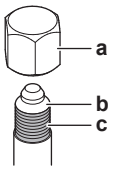
Operating with the stop valves closed will damage the compressor.

NOTICE

After adding the refrigerant, do not forget to close the lid of the refrigerant charging port. The tightening torque for the lid is 11.5 to 13.9 N•m.

NOTICE

Thread-locking fluid. Before reattaching the service port cover, apply thread-locking fluid to the screw thread (NOT to the cover or sealing part) . Otherwise, condensation water might enter and freeze. **Possible consequence:** Deformation, refrigerant leakage and compressor malfunction.



a Cover (do NOT apply thread-locking fluid)
b Sealing part (do NOT apply thread-locking fluid)
c Screw thread with thread-locking fluid

5.6.4 Error codes when charging refrigerant

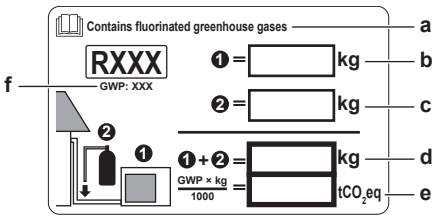
INFORMATION

If a malfunction occurs, a signal (220-240 V AC) is given to the error output (X2M/E1/E2), and the H2P LED on the main PCB is lit.

If a malfunction occurs, close valve A immediately. Confirm the malfunction code and take corresponding action, "8.1 Solving problems based on error codes" on page 21.

5.6.5 To fix the fluorinated greenhouse gases label

1 Fill in the label as follows:



a If a multilingual fluorinated greenhouse gases label is delivered with the unit (see accessories), peel off the applicable language and stick it on top of **a**.
b Factory refrigerant charge: see unit name plate
c Additional refrigerant amount charged
d Total refrigerant charge
e **Greenhouse gas emissions** of the total refrigerant charge expressed as tonnes CO_2-equivalent
f GWP = Global warming potential

NOTICE

In Europe, the **greenhouse gas emissions** of the total refrigerant charge in the system (expressed as tonnes CO_2-equivalent) is used to determine the maintenance intervals. Follow the applicable legislation.

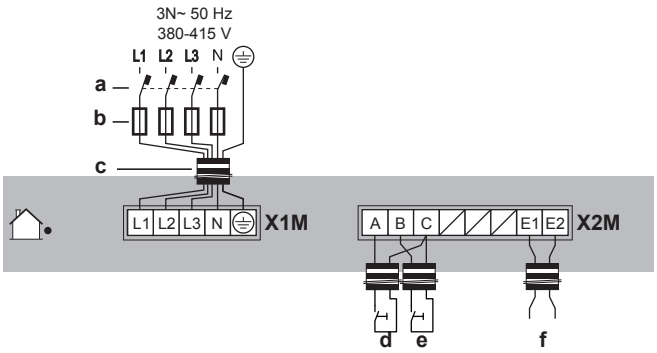
Formula to calculate the greenhouse gas emissions: GWP value of the refrigerant × Total refrigerant charge [in kg] / 1000

2 Fix the label on the inside of the outdoor unit near the gas and liquid stop valves.

5.7 Connecting the electrical wiring

5.7.1 Field wiring: Overview

Field wiring consists of the following:



a Earth leakage circuit breaker
b Fuse
c Power supply (including earth) (sheathed cable)
d Low-noise switch
e Operation switch
f Error output

NOTICE

Operation switch. An operation switch is required to turn outdoor unit operation ON/OFF. The outdoor unit cannot operate without it. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC).

NOTICE

Low-noise switch. If you want to remotely turn ON/OFF low-noise operation (see setting [2-25]), you must install a low-noise switch. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC).

NOTICE

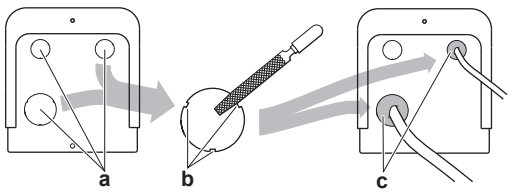
Error output. If system malfunctions are likely to degrade the articles in the room/showcase, you can install an alarm (example: lamp). If a malfunction occurs, a signal (220-240 V AC) is given to the error output (X2M/E1/E2). Use an alarm with a maximum load of 0.5 A.

5.7.2 Guidelines when knocking out knockout holes

NOTICE

Precautions when making knockout holes:

- Avoid damaging the casing.
- After making the knockout 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 knockout holes, wrap the wiring with protective tape to prevent damage.



a Knockout hole
b Burr
c Sealant etc.

5.7.3 Guidelines when connecting the electrical wiring

Tightening torques

Wiring	Screw size	Tightening torque (N•m)
Power supply wiring (power supply + shielded ground)	M5	2.2~2.7
Operation switch, low-noise switch and error output	M3.5	0.8~0.97

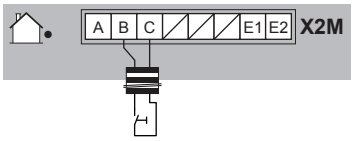
5.7.4 To connect the electrical wiring on the outdoor unit

NOTICE

- Follow the wiring diagram (delivered with the unit, located at the inside of the service cover).
- Make sure the electrical wiring does NOT obstruct proper reattachment of the service cover.

1 Remove the service cover.

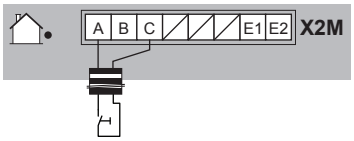
2 Connect the **operation switch** as follows:



NOTICE

Operation switch. An operation switch is required to turn outdoor unit operation ON/OFF. The outdoor unit cannot operate without it. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC).

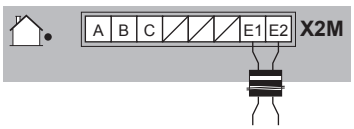
3 Connect the **low-noise switch** as follows:



NOTICE

Low-noise switch. If you want to remotely turn ON/OFF low-noise operation (see setting [2-25]), you must install a low-noise switch. Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC).

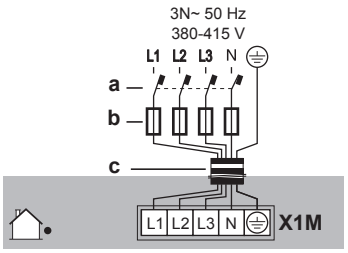
4 Connect the **error output** as follows:



NOTICE

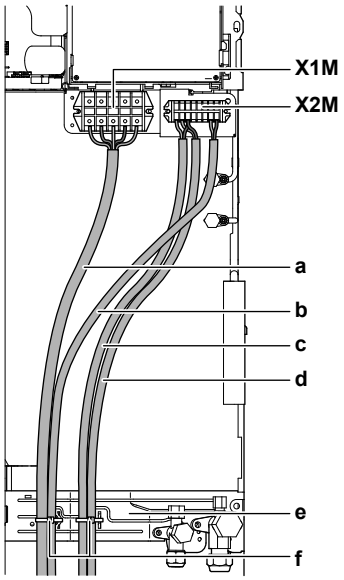
Error output. If system malfunctions are likely to degrade the articles in the room/showcase, you can install an alarm (example: lamp). If a malfunction occurs, a signal (220-240 V AC) is given to the error output (X2M/E1/E2). Use an alarm with a maximum load of 0.5 A.

5 Connect the **power supply** as follows:



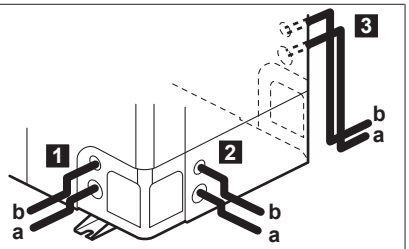
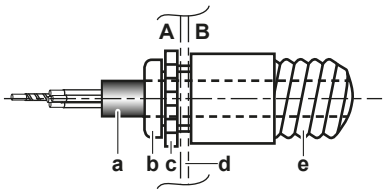
a Earth leakage circuit breaker
b Fuse
c Power supply cable

6 Fix the cables with cable ties.



a Power supply (including earth)
b Error output
c Low-noise switch
d Operation switch
e Attachment plate
f Cable tie

7 Route the wiring through the frame and connect it to it.

Routing through the frame	 **a** Power supply cable and error output cable **b** Operation switch cable and low-noise switch cable
Connecting to the frame	When cables are routed from the unit, a protection sleeve for the conduits (PG insertions) can be inserted at the knockout hole. When you do not use a wire conduit, protect the wires with vinyl tubes to prevent the edge of the knockout hole from cutting the wires.  **A** Inside of the outdoor unit **B** Outside of the outdoor unit **a** Wire **b** Bush **c** Nut **d** Frame **e** Hose

8 Reattach the service cover.

9 Connect an earth leakage circuit breaker and fuse to the power supply line.

6 Configuration

INFORMATION

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

DANGER: RISK OF ELECTROCUTION

6.1 Making field settings

6.1.1 About making field settings

To configure the condensing unit, you must give input to the outdoor unit's main PCB (A1P). This involves the following field setting components:

- Push buttons to give input to the PCB
- A display to read feedback from the PCB

Field settings are defined by their mode, setting and value. Example: [2-8]=4.

Mode 1 and 2

Mode	Description
Mode 1 (monitoring settings)	Mode 1 can be used to monitor the current situation of the outdoor unit. Some field setting contents can be monitored as well.

Mode	Description
Mode 2 (field settings)	Mode 2 is used to change the field settings of the system. Consulting the current field setting value and changing the current field setting value is possible. In general, normal operation can be resumed without special intervention after changing field settings. Some field settings are used for special operation. In such a case, it is required to abort the special operation before normal operation can restart. It will be indicated in below explanations.

6.1.2 To access the field setting components

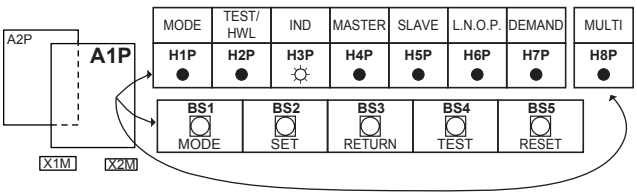
See "5.1.1 To open the outdoor unit" on page 7.

6.1.3 Field setting components

NOTICE

The DIP switch (DS1 on A1P) is not used. Do NOT change the factory setting.

The components to make field settings are as follows:



BS1~BS5 Push buttons
H1P~H7P 7-LEDs display
H8P LED for indication during initialisation
ON (☼) OFF (●) Flashing (☀)

Push buttons

Use the push buttons to make the field settings. Operate the push buttons with an insulated stick (such as a closed ball-point pen) to avoid touching of live parts.

BS1 MODE: For changing the set mode
BS2 SET: For field setting
BS3 RETURN: For field setting
BS4 Not used
BS5 Not used

7-LEDs display

The display gives feedback about the field settings, which are defined as [Mode-Setting]=Value.

H1P Shows the mode
H2P~H7P Shows the settings and values, represented in binary code
H8P NOT used for field settings, but used during initialisation

Example:

[H1P- 32 + 16 + 8 + 4 + 2 + 1] H1P H2P H3P H4P H5P H6P H7P	Description
● ● ☼ ● ● ● ● (H1P OFF)	Default situation
☀ ● ☼ ● ● ● ● (H1P flashing)	Mode 1
☼ ● ● ● ● ● ● (H1P ON)	Mode 2
☼ ● ● ☼ ● ● ● 0 + 0 + 8 + 0 + 0 + 0 (H2P~H7P = binary 8)	Setting 8 (in mode 2)
[H1P- 32 + 16 + 8 + 4 + 2 + 1] H1P H2P H3P H4P H5P H6P H7P	Description
☼ ● ● ● ☀ ● ● 0 + 0 + 0 + 4 + 0 + 0 (H2P~H7P = binary 4)	Value 4 (in mode 2)

6.1.4 To access mode 1 or 2

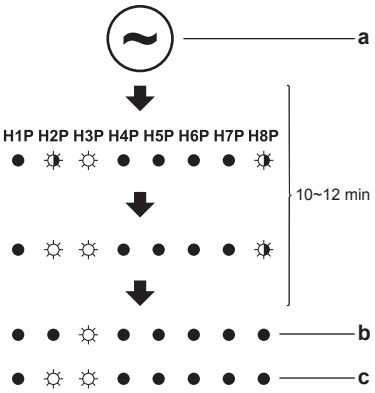
After the units are turned ON, the display goes to its default situation. From there, you can access mode 1 and mode 2.

Initialisation: default situation

NOTICE

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.

Turn on the power supply of the outdoor unit, and turn on the external operation switch. After initialisation, the display indication state will be as below (default situation when shipped from factory).

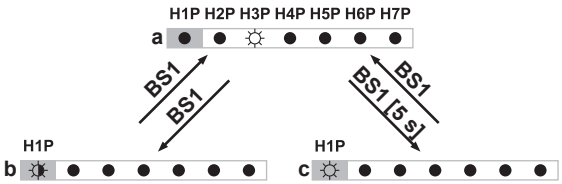


a Power ON
b Default situation
c LED indication when there is a malfunction

If the default situation is not displayed after 10~12 minutes, check the malfunction code. Solve the malfunction code accordingly.

Switching between modes

Use BS1 to switch between the default situation, mode 1 and mode 2.



a Default situation (H1P OFF)
b Mode 1 (H1P flashing)
c Mode 2 (H1P ON)
BS1 Press BS1.
BS1 [5 s] Press BS1 for at least 5 s.

INFORMATION

If you get confused in the middle of the process, press BS1 to return to the default situation.

6.1.5 To use mode 1

In mode 1 (and in default situation) you can read out some information.

Example: 7-LEDs display – Default situation

You can read out the status of low noise operation as follows:

#	Action	Button/display
1	Make sure the LEDs are showing the default situation.	H1P H2P H3P H4P H5P H6P H7P ● ● ☼ ● ● ● ● (H1P OFF)
2	Check the status of LED H6P.	● ● ☼ ● ● ● ● H6P OFF: Unit is currently not operating under low noise restrictions.
		● ● ☼ ● ● ☼ ● H6P ON: Unit is currently operating under low noise restrictions.

Example: 7-LEDs display – Mode 1

See "8.1.1 To display the error codes of the latest malfunctions" on page 21.

6.1.6 To use mode 2

In mode 2 you can make field settings to configure the system.

Example: 7-LEDs display – Mode 2

You can change the value of setting [2-8] (= T_e target evaporating temperature) to 4 (= –4°C) as follows:

#	Action	Button/display
1	Start from the default situation.	H1P H2P H3P H4P H5P H6P H7P ● ● ☼ ● ● ● ●
2	Select mode 2.	BS1 [5 s] ☼ ● ● ● ● ● ●
3	Select setting 8. ("X×" depends on the setting that you want to select.)	BS2 [X×] ☼ ● ● ☼ ● ● ● (= binary 8)
4	Select value 4 (= –4°C). **a**: Display the current value. **b**: Change to 4. ("X×" depends on the current value, and the value that you want to select.) **c**: Enter the value in the system. **d**: Confirm. The system starts operating according to the setting.	**a** BS3 [1×] ☼ ● ● ● ● ● ● **b** BS2 [X×] ☼ ● ● ◐ ● ● ● **c** BS3 [1×] ☼ ● ● ● ☼ ● ● **d** BS3 [1×] ☼ ● ● ● ● ● ●
5	Quit mode 2.	BS1 [1×] ● ● ☼ ● ● ● ●

6.1.7 Mode 1 (and default situation): Monitoring settings

In mode 1 (and in default situation) you can read out some information.

7-LEDs display – Default situation (H1P OFF)

You can read out the following information:

	Value / Description	
H6P	Shows the status of low noise operation.	
	OFF	● ● ☼ ● ● ● ● Unit is currently not operating under low noise restrictions.
	ON	● ● ☼ ● ● ☼ ● Unit is currently operating under low noise restrictions.
	Low noise operation reduces the sound generated by the unit compared to nominal operating conditions. Low noise operation can be set in mode 2. There are two methods to activate low noise operation of the outdoor unit system. ▪ The first method is to enable an automatic low noise operation during night time by field setting. The unit will operate at the selected low noise level during the selected time frames. ▪ The second method is to enable low noise operation based on an external input. For this operation a low noise switch needs to be installed (see "5.7.4 To connect the electrical wiring on the outdoor unit" on page 15).	

7-LEDs display – Mode 1 (H1P flashing)

You can read out the following information:

Setting (H1P H2P H3P H4P H5P H6P H7P)	Value / Description
[1-14] ◐ ● ● ☼ ☼ ☼ ● Shows the latest malfunction code.	For more information, see "8.1 Solving problems based on error codes" on page 21.
[1-15] ◐ ● ● ☼ ☼ ☼ ☼ Shows the 2nd last malfunction code.	
[1-16] ◐ ● ☼ ● ● ● ● Shows the 3rd last malfunction code.	

6.1.8 Mode 2: Field settings

In mode 2 you can make field settings to configure the system. The LEDs give a binary representation of the setting/value number.

Setting H1P H2P H3P H4P H5P H6P H7P (= binary)	Value H1P H2P H3P H4P H5P H6P H7P	Description
[2-8] ☼ ● ● ☼ ● ● ● T_e target evaporating temperature.	☼ ● ● ● ● ● ◐	–10°C
	☼ ● ● ● ● ◐ ●	–8°C
	☼ ● ● ● ● ◐ ◐	–6°C
	☼ ● ● ● ◐ ● ●	–4°C (default)
	☼ ● ● ● ◐ ● ◐	–2°C
	☼ ● ● ● ◐ ◐ ●	0°C
	☼ ● ● ● ◐ ◐ ◐	2°C

Setting H1P H2P H3P H4P H5P H6P H7P (= binary)	Value H1P H2P H3P H4P H5P H6P H7P	Description	
[2-18] ☼ ● ☼ ● ● ☼ ● Fan high static pressure setting. In order to increase the static pressure the outdoor unit fan is delivering, this setting should be activated. For details about this setting, see technical specifications.	☼ ● ● ● ● ● ☼ (default)	Deactivated.	
	☼ ● ● ● ● ☼ ●	Activated.	
[2-21] ☼ ● ☼ ● ☼ ● ☼ Refrigerant recovery/vacuuming mode. In order to achieve a free pathway to reclaim refrigerant out of the system or to remove residual substances or to vacuum the system it is necessary to apply a setting which will open required valves in the refrigerant circuit so the reclaim of refrigerant or vacuuming process can be done properly.	☼ ● ● ● ● ● ☼ (default)	Deactivated.	
	☼ ● ● ● ● ☼ ●	Activated. To stop the refrigerant recovery/vacuuming mode, push BS1. If BS1 is not pushed, the system will remain in refrigerant recovery/ vacuuming mode.	
[2-22] ☼ ● ☼ ● ☼ ☼ ● Automatic low noise setting and level during night time. By changing this setting, you activate the automatic low noise operation function of the unit and define the level of operation. Depending on the chosen level, the noise level will be lowered. The start and stop moments for this function are defined under setting [2-26] and [2-27].	☼ ● ● ● ● ● ● (default)	Deactivated	
	☼ ● ● ● ● ● ☼	Level 1	Level 3<Level 2<Level 1
	☼ ● ● ● ● ☼ ●	Level 2	
	☼ ● ● ● ● ☼ ☼	Level 3	
[2-25] ☼ ● ☼ ☼ ● ● ☼ Low noise operation level via the low noise switch. If the system needs to be running under low noise operation conditions when an external signal is sent to the unit, this setting defines the level of low noise that will be applied.	☼ ● ● ● ● ● ☼	Level 1	Level 3<Level 2<Level 1
	☼ ● ● ● ● ☼ ● (default)	Level 2	
	☼ ● ● ● ☼ ● ●	Level 3	
[2-26] ☼ ● ☼ ☼ ● ☼ ● Low noise operation start time. This setting is used in conjunction with setting [2-22].	☼ ● ● ● ● ● ☼	20h00	
	☼ ● ● ● ● ☼ ● (default)	22h00	
	☼ ● ● ● ☼ ● ●	24h00	
[2-27] ☼ ● ☼ ☼ ● ☼ ☼ Low noise operation stop time. This setting is used in conjunction with setting [2-22].	☼ ● ● ● ● ● ☼	6h00	
	☼ ● ● ● ● ☼ ●	7h00	
	☼ ● ● ● ☼ ● ● (default)	8h00	

7 Commissioning

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.

7.1 Precautions when commissioning

CAUTION

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

When performing the test operation, not only the outdoor unit, but the connected indoor unit will operate as well. Working on an indoor unit while performing a test operation is dangerous.

NOTICE

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.

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 for details.

7.2 Checklist before commissioning

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.

☐	You read the complete installation and operation instructions, as described in the **installer and user reference guide**.
☐	**Installation** Check that the unit is properly installed, to avoid abnormal noises and vibrations when starting up the unit.
☐	**Field wiring** Be sure that the field wiring has been carried out according to the instructions described in the chapter "5.7 Connecting the electrical wiring" on page 14, according to the wiring diagrams and according to the applicable legislation.
☐	**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.
☐	**Earth wiring** Be sure that the earth wires have been connected properly and that the earth terminals are tightened.

☐	**Insulation test of the main power circuit** Using a megatester 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 megatester for the transmission wiring.
☐	**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 "4.3.1 Safety device requirements" on page 7. Be sure that neither a fuse nor a protection device has been bypassed.
☐	**Internal wiring** Visually check the electrical component box and the inside of the unit on loose connections or damaged electrical components.
☐	**Pipe size and pipe insulation** Be sure that correct pipe sizes are installed and that the insulation work is properly executed.
☐	**Stop valves** Be sure that the stop valves are open on both liquid and gas side.
☐	**Damaged equipment** Check the inside of the unit on damaged components or squeezed pipes.
☐	**Refrigerant leak** Check the inside of the unit on refrigerant leakage. If there is a refrigerant leak, try to repair the leak. If the repair is unsuccessful, call your local dealer. Do not touch any refrigerant which has leaked out from refrigerant piping connections. This may result in frostbite.
☐	**Oil leak** Check the compressor for oil leakage. If there is an oil leak, try to repair the leak. If the repairing is unsuccessful, call your local dealer.
☐	**Air inlet/outlet** Check that the air inlet and outlet of the unit is not obstructed by paper sheets, cardboard, or any other material.
☐	**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.
☐	**Installation date and field setting** Be sure to keep record of the installation date on the rear of the front panel according to EN60335-2-40 and keep record of the contents of the field setting(s).

7.3 Checklist during commissioning

☐	To perform a **test run**.

7.3.1 About test run

Make sure to carry out the system test operation after the first installation.

The procedure below describes the test operation of the complete system.

7.3.2 To perform a test run (7-LEDs display)

1 Make sure all field settings you want are set; see "6.1 Making field settings" on page 16.

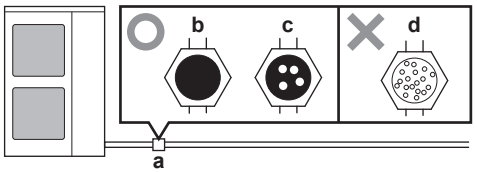
2 Turn ON the power to the outdoor unit and the connected indoor units.

NOTICE

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 Turn ON the operation switch of the outdoor unit.

4 Check the sight glass of the outdoor unit. If the refrigerant is NOT in sealing state, charge extra refrigerant, but do NOT exceed 10% of the determined additional refrigerant amount (see "5.6.2 To determine the additional refrigerant amount" on page 12).



O Sealing state (= sufficient refrigerant)
X Insufficient refrigerant
a Sight glass
b Full of liquid
c A little foam in the liquid
d A lot of foam in the liquid

5 Check if the indoor unit blows cold air, and the room/showcase temperature decreases.

6 Turn OFF the operation switch of the outdoor unit.

CAUTION

Do NOT turn OFF power by disconnecting the power supply directly. **Possible consequence:**

- The auto restart function of the unit might automatically resume operation after the power supply is reconnected.
- Compressor malfunction.

7 Check the test operation results on the outdoor unit 7-LEDs display.

Completion	Description
Normal completion	● ● ☼ ● ● ● ●
Abnormal completion	● ☼ ☼ ● ● ● ● Refer to "7.3.3 Correcting after abnormal completion of the test run" on page 20 to take actions for correcting the abnormality. When the test operation is fully completed, normal operation is possible.

7.3.3 Correcting after abnormal completion of the test run

The test operation is only completed if no malfunction occurs. In case of a malfunction, perform correcting actions as explained in the error code table (see "8.1.2 Error codes: Overview" on page 21). Carry out the test operation again and confirm that the abnormality is properly corrected.

INFORMATION

If a malfunction occurs, a signal (220-240 V AC) is given to the error output (X2M/E1/E2), and the H2P LED on the main PCB is lit.

INFORMATION

Refer to the installation manual of the indoor unit for detailed malfunction codes related to indoor units.

7.3.4 Operating the unit

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

8 Troubleshooting

8.1 Solving problems based on error codes

INFORMATION

If a malfunction occurs, a signal (220-240 V AC) is given to the error output (X2M/E1/E2), and the H2P LED on the main PCB is lit.

You can display the error codes of the 3 latest malfunctions by using the push buttons and 7-LEDs display (see "6.1.3 Field setting components" on page 17). Error codes consist of 2 characters (example: E3).

After solving the problem, reset the malfunction by turning OFF and ON the external operation switch, and retry operation.

8.1.1 To display the error codes of the latest malfunctions

#	Action		Display
1	Start from the default situation.		H1P H2P H3P H4P H5P H6P H7P ● ● ☼ ● ● ● ●
2	Select mode 1.	BS1 [1×]	☀ ● ● ● ● ● ●
3	Select a malfunction. ("X×" depends on the setting that you want to select.)	BS2 [X×]	**Possible malfunctions:** [1-14] Latest malfunction: ☀ ● ● ☼ ☼ ☼ ● [1-15] 2nd last malfunction: ☀ ● ● ☼ ☼ ☼ ☼ [1-16] 3rd last malfunction: ☀ ● ☼ ● ● ● ●
4	Display the **first character** of the error code.	BS3 [1×]	**Possible characters:** E: ☀ ● ● ● ● ☀ ☀ H: ☀ ● ● ● ☀ ● ● F: ☀ ● ● ● ☀ ● ☀ J: ☀ ● ● ● ☀ ☀ ● L: ☀ ● ● ● ☀ ☀ ☀ P: ☀ ● ● ☀ ● ● ● U: ☀ ● ● ☀ ● ● ☀
5	Display the **second character** of the error code.	BS2 [1×]	**Possible characters:** 1: ☀ ● ● ● ● ● ☀ 2: ☀ ● ● ● ● ☀ ● 3: ☀ ● ● ● ● ☀ ☀ 4: ☀ ● ● ● ☀ ● ● 5: ☀ ● ● ● ☀ ● ☀ 6: ☀ ● ● ● ☀ ☀ ● 7: ☀ ● ● ● ☀ ☀ ☀ 8: ☀ ● ● ☀ ● ● ● 9: ☀ ● ● ☀ ● ● ☀ A: ☀ ● ● ☀ ● ☀ ● C: ☀ ● ● ☀ ☀ ● ●
6	Quit mode 1.	BS1 [1×]	● ● ☼ ● ● ● ●

8.1.2 Error codes: Overview

Code	Cause	Solution
E3	▪ The stop valve of an outdoor unit is left closed. ▪ Refrigerant overcharge	▪ Open the stop valve on both the gas and liquid side. ▪ Recalculate the required amount of refrigerant and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
E4	▪ The stop valve of an outdoor unit is left closed. ▪ Insufficient refrigerant	▪ Open the stop valve on both the gas and liquid side. ▪ Check if the additional refrigerant charge has been finished correctly. Recalculate the required amount of refrigerant and add an adequate amount of refrigerant.
E7	Fan motor malfunction (M1F) – A2P (X106A) (M2F) – A2P (X107A)	Check connection on PCB or actuator.
E9	Electronic expansion valve malfunction (Y1E) - A1P (X21A) (Y3E) - A1P (X22A)	Check connection on PCB or actuator.
F3	▪ The stop valve of an outdoor unit is left closed. ▪ Insufficient refrigerant	▪ Open the stop valve on both the gas and liquid side. ▪ Check if the additional refrigerant charge has been finished correctly. Recalculate the required amount of refrigerant and add an adequate amount of refrigerant.
F6	Refrigerant overcharge	Recalculate the required amount of refrigerant and correct the refrigerant charge level by recovering any excessive refrigerant with a refrigerant recovery machine.
H9	Ambient temperature sensor malfunction (R1T) - A1P (X11A)	Check connection on PCB or actuator.
J3	Discharge temperature sensor malfunction (R2T): open circuit / short circuit - A1P (X12A)	Check connection on PCB or actuator.
J5	Suction temperature sensor malfunction (R3T) - A1P (X12A) (R5T) - A1P (X12A)	Check connection on PCB or actuator.

Code	Cause	Solution
J6	Liquid temperature sensor (coil) malfunction (R6T) - A1P (X13A)	Check connection on PCB or actuator.
J7	Liquid temperature sensor (after subcool HE) malfunction (R7T) - A1P (X13A)	Check connection on PCB or actuator.
J9	Gas temperature sensor (after subcool HE) malfunction (R4T) - A1P (X12A)	Check connection on PCB or actuator.
JA	High pressure sensor malfunction (S1NPH): open circuit / short circuit - A1P (X17A)	Check connection on PCB or actuator.
JC	Low pressure sensor malfunction (S1NPL): open circuit / short circuit - A1P (X18A)	Check connection on PCB or actuator.

Code	Cause	Solution
L4	▪ Fin temperature rise because of inverter malfunction. ▪ Fin temperature rise because of short circuit. ▪ Fin thermistor malfunction.	▪ Remove obstacles that block the passage of air to the outdoor unit. ▪ Check connection on PCB or actuator.
LC	Transmission outdoor unit - inverter: INV1 / FAN1 transmission trouble	Check connection.
P1	INV1 unbalanced power supply voltage	Check if power supply is within range.
U1	Reversed power supply phase malfunction	Correct phase order.
U2	Insufficient supply voltage	Check if the supply voltage is supplied properly.

9 Technical data

Latest information can be found in the technical engineering data.

9.1 Service space: Outdoor unit

When mounting units side by side, the piping route must be to the front, to the back or downwards. In this case the piping route to the side is not possible.
When mounting the units side by side and routing the piping to the back, you must keep a distance of ≥250 mm between the units (instead of ≥100 mm as shown on the figures below).

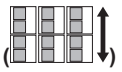
Single unit () | Single row of units ()

See figure 1 on the inside of the front cover.

A,B,C,D	Obstacles (walls/baffle plates)
E	Obstacle (roof)
a,b,c,d,e	Minimum service space between the unit and obstacles A, B, C, D and E
e_B	Maximum distance between the unit and the edge of obstacle E, in the direction of obstacle B
e_D	Maximum distance between the unit and the edge of obstacle E, in the direction of obstacle D
H_U	Height of the unit
H_B,H_D	Height of obstacles B and D
1	Seal the bottom of the installation frame to prevent discharged air from flowing back to the suction side through the bottom of the unit.
2	Maximum two units can be installed.
⃠	Not allowed

Multiple rows of units ()

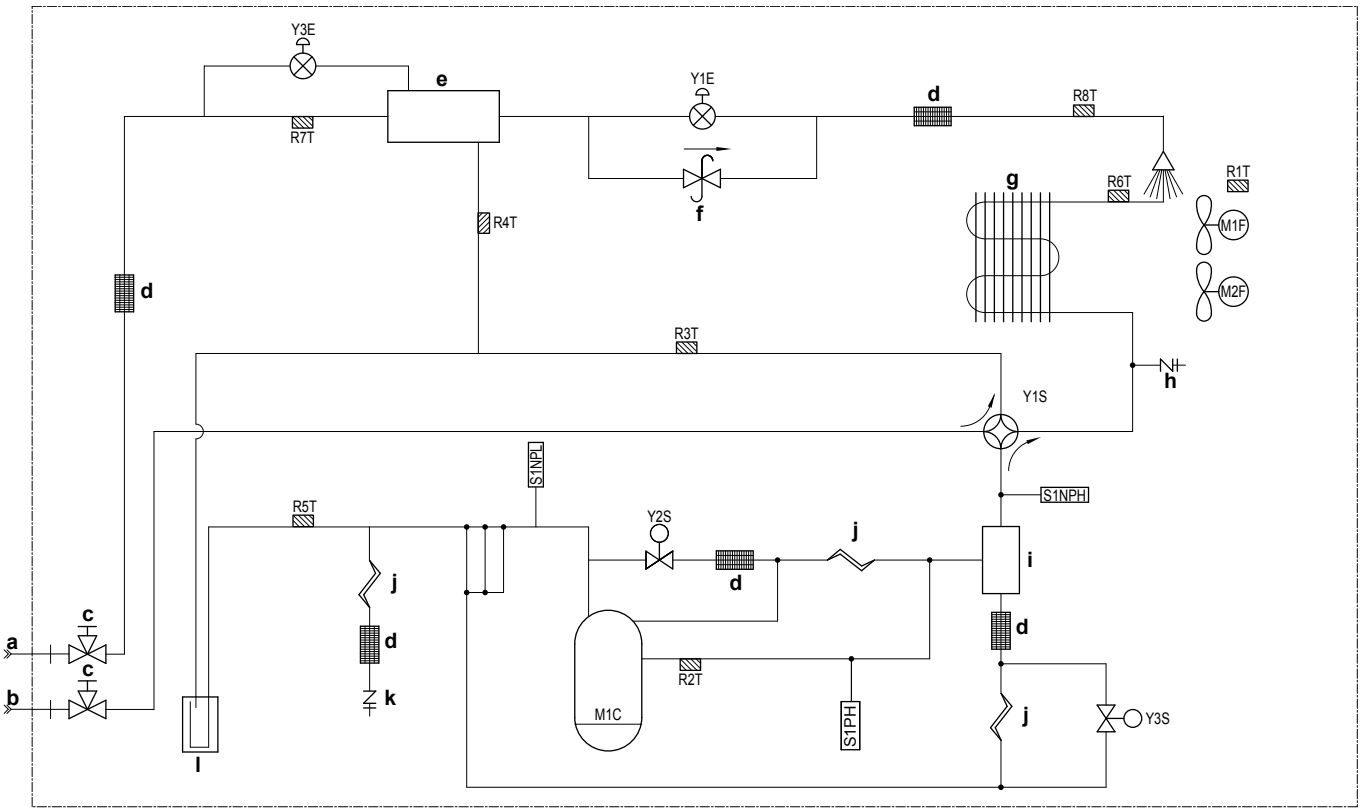
See figure 2 on the inside of the front cover.

Stacked units (max. 2 levels) ()

See figure 3 on the inside of the front cover.

A1=>A2	(A1) If there is danger of drainage dripping and freezing between the upper and lower units… (A2) Then install a **roof** between the upper and lower units. Install the upper unit high enough above the lower unit to prevent ice buildup at the upper unit's bottom plate.
B1=>B2	(B1) If there is no danger of drainage dripping and freezing between the upper and lower units… (B2) Then it is not required to install a roof, but **seal the gap** between the upper and lower units to prevent discharged air from flowing back to the suction side through the bottom of the unit.

9.2 Piping diagram: Outdoor unit



a	Field piping (liquid: Ø9.5 flare connection)
b	Field piping (gas: Ø15.9 flare connection)
c	Stop valve (with service port 5/16")
d	Filter (5×)
e	Subcool heat exchanger
f	Pressure regulating valve
g	Heat exchanger
h	Service port (high pressure)
i	Oil separator
j	Capillary tube (3×)
k	Service port (refrigerant charge)
l	Accumulator
M1C	Compressor
M1F-M2F	Fan motor
R1T	Thermistor (air)
R2T	Thermistor (discharge)
R3T	Thermistor (suction 1)
R4T	Thermistor (subcool heat exchanger)
R5T	Thermistor (suction 2)
R6T	Thermistor (heat exchanger)
R7T	Thermistor (liquid pipe 1)
R8T	Thermistor (liquid pipe 2)
S1NPH	High pressure sensor
S1NPL	Low pressure sensor
S1PH	High pressure switch
Y1E	Electronic expansion valve (main)
Y3E	Electronic expansion valve (subcool heat exchanger)
Y1S	4-way valve
Y2S	Solenoid valve (hot gas)
Y3S	Solenoid valve (unloader circuit)
→	Cooling

9.3 Wiring diagram: Outdoor unit

The wiring diagram is delivered with the unit, located at the inside of the service cover.

Notes:

1 This wiring diagram applies only to the outdoor unit.

2 Symbols (see below).

3 Symbols (see below).

4 Refer to the installation manual or service manual on how to use BS1~BS5 push button switch and DS1-1, DS1-2 DIP switch.

5 Do not operate the unit by short-circuiting protection device S1PH.

6 Colours (see below).

7 Use a voltage-free contact for microcurrent (≤1 mA, 12 V DC).

8 Error output is 220-240 V AC, with a maximum load of 0.5 A.

Symbols:

L	Live
N	Neutral
	Field wiring
	Terminal strip
	Connector
	Fixed connector
	Movable connector
	Protective earth (screw)
	Noiseless earth
	Terminal

Colours:

BLK	Black
BLU	Blue
BRN	Brown
GRN	Green
ORG	Orange
RED	Red
WHT	White

YLW	Yellow

Legend for wiring diagram LRMEQ3+4:

A1P	Printed circuit board (main)
A2P	Printed circuit board (inverter)
BS1~BS5	Push button switch (MODE, SET, RETURN, TEST, RESET)
C1~C3	Capacitor
DS1	DIP switch
E1HC	Crankcase heater
F1U~F4U (A1P)	Fuse (T 6.3 A / 250 V)
F5U	Fuse (F 1.0 A / 250 V)
H1P~H8P	Light-emitting diode (service monitor is orange) H2P: ▪ Prepare, test: Flickering ▪ Malfunction detection: Light up
HAP (A1P)	Light-emitting diode (service monitor is green)
HAP (A2P)	Light-emitting diode (service monitor is green)
K1M (A1P)	Magnetic contactor
K1R	Magnetic relay (Y1S)
K2R	Magnetic relay (Y2S)
K3R	Magnetic relay (Y3S)
K4R	Magnetic relay (E1HC)
K5R, K6R	Magnetic relay
L1R	Reactor
M1C	Motor (compressor)
M1F	Motor (fan) (upper)
M2F	Motor (fan) (lower)
PS	Switching power supply
Q1DI	Earth leakage circuit breaker (300 mA)
R1 (A1P)	Resistor
R1 (A2P), R2 (A2P)	Resistor
R1T	Thermistor (air)
R2T	Thermistor (M1C discharge)
R3T	Thermistor (suction 1)
R4T	Thermistor (subcool)
R5T	Thermistor (suction 2)
R6T	Thermistor (heat exchanger)
R7T	Thermistor (liquid 1)
R8T	Thermistor (liquid 2)
R9T	Thermistor (power module)
S1NPH	Pressure sensor (high)
S1NPL	Pressure sensor (low)
S1PH	Pressure switch (high)
V1R	Power module
V2R, V3R	Diode module
X1M	Terminal strip (power supply)
X2M	Terminal strip
Y1E	Electronic expansion valve (main)
Y3E	Electronic expansion valve (subcool)
Y2S	Solenoid valve (hot gas)
Y3S	Solenoid valve (unloader circuit)
Z1C~Z4C	Noise filter (ferrite core)
Z1F	Noise filter (with surge absorber)
Z2F	Noise filter

For the user

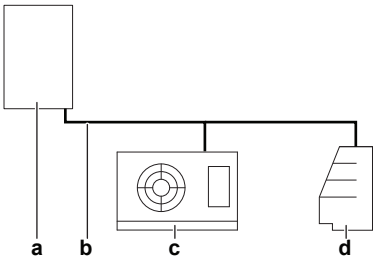
10 About the system

NOTICE

For future modifications or expansions of your system:

A full overview of allowable combinations (for future system extensions) is available in technical engineering data and should be consulted. Contact your installer to receive more information and professional advice.

10.1 System layout



a Outdoor unit (ZEAS condensing unit)
b Refrigerant piping
c Indoor unit (Blower coil)
d Indoor unit (Showcase)

11 Operation

11.1 Operation range

Use the system in the following temperature ranges for safe and effective operation.

	Cooling
Outdoor temperature	–10~43°C DB
Evaporating temperature	–10~2°C

11.2 Operating the system

11.2.1 About operating the system

- To protect the unit, turn on the main power switch 6 hours before operation.
- To start and stop operation of the outdoor unit, use the external operation switch.
- If the main power supply is turned off during operation, operation will restart automatically after the power turns back on again.

12 Maintenance and service

NOTICE

Never inspect or service the unit by yourself. Ask a qualified service person to perform this work.

WARNING

Never replace a fuse with a fuse of a wrong ampere ratings or other wires when a fuse blows out. Use of wire or copper wire may cause the unit to break down or cause a fire.

CAUTION

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

CAUTION

After a long use, check the unit stand and fitting for damage. If damaged, the unit may fall and result in injury.

12.1 About the refrigerant

This product contains fluorinated greenhouse gases. Do NOT vent gases into the atmosphere.

Refrigerant type: R410A

Global warming potential (GWP) value: 2087.5

NOTICE

In Europe, the **greenhouse gas emissions** of the total refrigerant charge in the system (expressed as tonnes CO_2-equivalent) is used to determine the maintenance intervals. Follow the applicable legislation.

Formula to calculate the greenhouse gas emissions: GWP value of the refrigerant × Total refrigerant charge [in kg] / 1000

Please contact your installer for more information.

WARNING

The refrigerant in the system is safe and normally does not leak. If the refrigerant leaks in the room, contact with a fire of a burner, a heater or a cooker may result in a harmful gas.

Turn off any combustible heating devices, ventilate the room and contact the dealer where you purchased the unit.

Do not use the system until a service person confirms that the portion where the refrigerant leaks is repaired.

12.2 After-sales service and warranty

12.2.1 Warranty period

- This product includes a warranty card that was filled in by the dealer at the time of installation. The completed card has to be checked by the customer and stored carefully.
- If repairs to the product are necessary within the warranty period, contact your dealer and keep the warranty card at hand.

12.2.2 Recommended maintenance and inspection

Since dust collects when using the unit for several years, performance of the unit will deteriorate to some extent. As taking apart and cleaning interiors of units requires technical expertise and in order to ensure the best possible maintenance of your units, we recommend to enter into a maintenance and inspection contract on top of normal maintenance activities. Our network of dealers has access to a permanent stock of essential components in order to keep your unit in operation as long as possible. Contact your dealer for more information.

When asking your dealer for an intervention, always state:

- The complete model name of the unit.
- The manufacturing number (stated on the nameplate of the unit).
- The installation date.
- The symptoms or malfunction, and details of the defect.

WARNING

- Do not modify, disassemble, remove, reinstall or repair the unit yourself as incorrect dismantling or installation may cause an electric shock or fire. Contact your dealer.
- In case of accidental refrigerant leaks, make sure there are no naked flames. The refrigerant itself is entirely safe, non-toxic and non-combustible, but it will generate toxic gas when it accidentally leaks into a room where combustible air from fan heaters, gas cookers, etc. is present. Always have qualified service personnel confirm that the point of leakage has been repaired or corrected before resuming operation.

13 Troubleshooting

If system malfunctions are likely to degrade the articles in the room/showcase, you can ask your installer to install an alarm (example: lamp). For more information, contact your installer.

If one of the following malfunctions occur, take the measures shown below and contact your dealer.

WARNING

Stop operation and shut off the power if anything unusual occurs (burning smells etc.).

Leaving the unit running under such circumstances may cause breakage, electric shock or fire. Contact your dealer.

The system must be repaired by a qualified service person:

Malfunction	Measure
If a safety device such as a fuse, a breaker or an earth leakage breaker frequently actuates or the ON/OFF switch does not properly work.	Turn off the main power switch.
If water leaks from the unit.	Stop the operation.
The operation switch does not work well.	Turn off the power.

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

Malfunction	Measure
If the system does not operate at all.	▪ Check if there is no power failure. Wait until power is restored. If power failure occurs during operation, the system automatically restarts immediately after the power supply is recovered. ▪ Check if no fuse has blown or breaker has worked. Change the fuse or reset the breaker if necessary.

Malfunction	Measure
The system stops immediately after starting operation.	▪ Check if air inlet or outlet of outdoor or indoor unit is not blocked by obstacles. Remove any obstacle and make it well-ventilated.
The system operates but cooling is insufficient.	▪ Check if air inlet or outlet of outdoor or indoor unit is not blocked by obstacles. Remove any obstacle and make it well-ventilated. ▪ Check if the indoor unit is not frosted up. Defrost the unit manually, or shorten the defrost operation cycle. ▪ Check if there are not too many articles inside the room/showcase. Remove a couple of articles. ▪ Check if there is smooth air circulation inside the room/showcase. Reorganise the articles inside the room/showcase. ▪ Check if there is not too much dust on the outdoor unit heat exchanger. Remove the dust with a brush or vacuum cleaner, without using water. If necessary, consult your dealer. ▪ Check if there is cold air leaking outside of the room/showcase. Stop the air from leaking outside. ▪ Check if you did not set the indoor unit setpoint temperature too high. Set the setpoint appropriately. ▪ Check if there are no high-temperature articles stored in the room/showcase. Always store articles after they have cooled down. ▪ Check if the door is not opened too long. Reduce the opening time of the door.

If after checking all above items, it is impossible to fix the problem yourself, contact your installer and state the symptoms, the complete model name of the unit (with manufacturing number if possible) and the installation date (possibly listed on the warranty card).

13.1 Symptoms that are NOT system malfunctions

The following symptoms are NOT system malfunctions:

13.1.1 Symptom: The system does not operate

- The system does not start immediately after it is turned ON again. If the operation lamp lights, the system is in normal condition. To prevent overloading of the compressor motor, the system starts 5 minutes after it is turned ON again in case it was turned OFF just before.
- The system does not start immediately after the power supply is turned on. Wait one minute until the micro computer is prepared for operation.

13.1.2 Symptom: The unit does not stop immediately when operation is stopped

This is to prevent components from being damaged. The unit will stop in a little while.

13.1.3 Symptom: Noise (Outdoor unit)

- A continuous low hissing sound is heard when the system is in cooling operation. This is the sound of refrigerant gas flowing through both indoor and outdoor units.
- A hissing sound which is heard at the start or immediately after stopping operation. This is the noise of refrigerant caused by flow stop or flow change.
- When the tone of operating noise changes. This noise is caused by the change of frequency.

13.1.4 Symptom: Dust comes out of the unit

When the unit is used for the first time in a long time. This is because dust has gotten into the unit.

13.1.5 Symptom: The outdoor unit fan does not spin

During operation. The speed of the fan is controlled in order to optimise product operation.

13.1.6 Symptom: The inside of an outdoor unit is warm even when the unit has stopped

This is because the crankcase heater is warming the compressor so that the compressor can start smoothly.

14 Relocation

Contact your dealer for removing and reinstalling the total unit. Moving units requires technical expertise.

15 Disposal

This unit uses hydrofluorocarbon. Contact your dealer when discarding this unit. It is required by law to collect, transport and discard the refrigerant in accordance with the "hydrofluorocarbon collection and destruction" regulations.

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DAIKIN EUROPE N.V.

Zandvoordestraat 300, B-8400 Oostende, Belgium

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