



INSTALLATION MANUAL

Outdoor unit for air to water heat pump

ERHQ011BAV3
ERHQ014BAV3
ERHQ016BAV3

ERHQ011BAW1
ERHQ014BAW1
ERHQ016BAW1

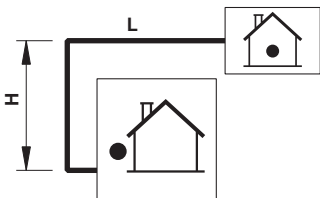
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ERLQ011CAW1
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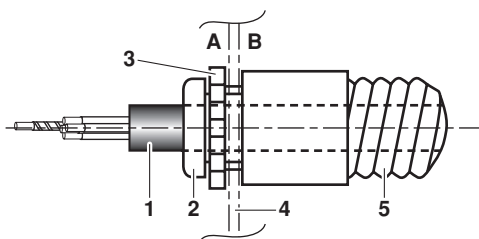
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							L2<L1	L2≤H	≥250			≥1500	≤500	≥1000	0<L2≤1/2 H
						H<L2	≥300							1/2 H<L2≤H	
						H<L2	L2≤H								

ERLQ		↖	↗	↘	↙	↕	A	B1	B2	C	D1	D2	E	L1/L2	
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	✓		✓	✓	✓		≥300	≥300		≥300		≤500	≥1000		
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	✓	✓					L1<L2	≥200			≥500				
							L2<L1	≥200			≥500				
							L1<L2	L1≤H	≥350	≤500		≥750		≥1000	0<L1≤1/2 H
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						L2<L1	L2≤H	≥200			≥1000	≥500	≥1000	0<L2≤1/2 H	
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						H<L2	L2≤H								

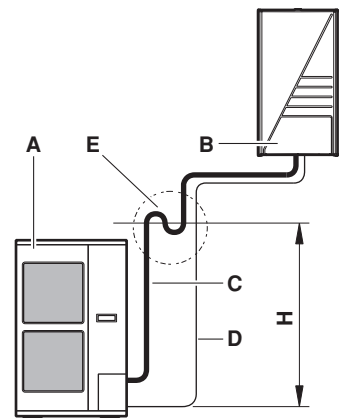
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2



3



4

CE - DECLARATION-OF-COMFORMITY
CE - KONFORMITÄTSEKHLÄRUNG
CE - DECLARATION-DE-CONFORMITE
CE - CONFORMITEITSEVERKLARING

Daikin Europe N.V.

- 01 (GB) declares under its sole responsibility that the equipment to which this declaration relates:
02 (E) erklärt auf seine alleinige Verantwortung, dass die Ausrüstung für die diese Erklärung bestimmt ist:
03 (D) déclare sous sa seule responsabilité que l'équipement visé par la présente déclaration:
04 (NL) verklaart hierbij op eigen exclusieve verantwoordelijkheid dat de apparatuur waarop deze verklaring betrekking heeft:
05 (I) dichiara bajo su única responsabilidad que el equipo al que hace referencia la declaración:
06 (C) dichiara sotto la propria responsabilità che gli apparecchi a cui è riferita questa dichiarazione:
07 (GR) δηλώνει με αποκλειστική της ευθύνη ότι ο εξοπλισμός στον οποίο αναφέρεται η παρούσα δήλωση:
08 (P) declara sob sua exclusiva responsabilidade que os equipamentos a que esta declaração se refere:

ERHQ011BAW1, ERHQ014BAW1, ERHQ016BAW1,
ERHQ011BAV3, ERHQ014BAV3, ERHQ016BAV3,
ERLQ011CAW1, ERLQ014CAW1, ERLQ016CAW1,
ERLQ011CAV3, ERLQ014CAV3, ERLQ016CAV3,

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 entsprechend entsprechen, unter der Voraussetzung,

daß sie gemäß unserer Anweisungen eingesetzt werden:

- 03 sont conformes à laux norme(s) ou autre(s) document(s) normatif(s), pour autant qu'ils soient utilisés conformément à nos instructions:
04 conform de volgen de norm(en) of één of meer andere bindende documenten zijn, op voorwaarde dat ze worden gebruikt overeenkomstig onze instructies:
05 están en conformidad con las) siguiente(s) norma(s) u otro(s) documento(s) normativo(s), siempre que sean utilizados de acuerdo con nuestras instrucciones:
06 sono conformi alle) standardi) o altro(i) documento(i) normativo(i) a carattere normativo, a patto che vengano usati in conformità alle nostre istruzioni:
07 είναι σύμφωνα με τις οδηγίες μας, υπό την προϋπόθεση ότι χρησιμοποιούνται σύμφωνα με τις οδηγίες μας:

EN60335-2-40,

- 01 are in conformity with the following provisions of:
02 gemäß den Vorschriften der:
03 conformemnt aux stipulations des:
04 overeenkomstig de bepalingen van:
05 siguiendo las disposiciones de:
06 secondo le prescrizioni per:
07 με τη χρήση των διατάξεων των:
08 de acordo com o previsto em:
09 в соответствии с положениями:
10 under captioned title:
11 enligt villkoren i:
12 gilt i henhold til bestemmelserne i:
13 noudatteen määräyksiä:
14 za doozren ustanoveni priedpisu:
15 prema odredbama:
16 követeli a(z):
17 zgodnie z postanowieniami Dyrektyw:
18 in urma prevederilor:

- 01 Note * as set out in <A> and judged positively by
according to the Certificate <C>.
02 Hinweis * wie in der <A> aufgeführt und von positiv beurteilt gemäß Zertifikat <C>.
03 Remarque * tel que défini dans <A> et évalué positivement par conformément au Certificat <C>.
04 Bemerk * zoals vermeld in <A> en positief beoordeeld door overeenkomstig Certificaat <C>.
05 Nota * como se establece en <A> y es valorado positivamente por de acuerdo con el Certificado <C>.
06 Nota * delineato nei <A> e giudicato positivamente da secondo il Certificato <C>.
07 Znakovon * ovnk, vobojčeta otro <A> kai kvletra Benađ onto to eklogavto me to Plromonimio <C>.
08 Nota * tal como estabelecido em <A> e avala o parecer positivo de de acordo com o Certificado <C>.
09 Примечание * как указано в <A> и в соответствии с соответствующим решением согласно Сертификату <C>.
10 Remark * como se definiu em <A> e o resultado positivo foi avalado por de acordo com o Certificado <C>.

CE - DECLARAÇÃO-DE-CONFORMIDADE
CE - ЗАРБИЊИЕ-О-ООТБЕТСТВО
CE - ÖPÝLDESZERKLÄRUNG
CE - FÖRSÄKRAN-OM ÖVERENSSTÄMMELSE

CE - IZJAVA-O-USKLABENOSTI
CE - MEGFELELŐSÉGI-NYILATKOZAT
CE - DEKLARACJA-ZGODNOSC
CE - DECLARAȚIE-DE-CONFORMITATE

CE - IZJAVA O SKLADNOSTI
CE - VASTAVUSDEKLARACIJA
CE - VYHLÁSENIE-ZHODY
CE - UYUMULUK-BİLDİRİSİ

CE - ATTIKTIES-DEKLARACIJA
CE - ATBLISTBAS-DEKLARACIJA
CE - VYHLÁSENIE-ZHODY
CE - UYUMULUK-BİLDİRİSİ

- 09 (GB) заверяет, исключительно под свою ответственность, что оборудование, к которому относится настоящее заявление:
10 (GB) erklæret som eneste ansvarlig, at udstyret, som er omfattet af denne erklæring:
11 (S) deklarerar i egenskap av huvudsansvarig, att utrustningen som berörs av denna deklaration innebär att:
12 (N) erklærer et fuldstændigt ansvar for at det udstyr som berøres af denne erklæring, innebærer at:
13 (NL) imrotaaz yleistomaan omalla vastuullaan, että tämän ilmoituksen tarkoituksena on todeta:
14 (D) prohlásuje ve své plné odpovědnosti, že zařízení, k němuž se toto prohlášení vztahuje:
15 (GR) δηλώνει υπό αποκλειστική ευθύνη μου ότι ο εξοπλισμός στον οποίο αναφέρεται η παρούσα δήλωση:
16 (P) teljes felelősséggel tudatában kijelentem, hogy a berendezések, melyekre e nyilatkozat vonatkozik:

- 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 ovenholder følgende standard(er) eller andre/andre retningsgivende dokument(er), brodsat at disse anvendes i henhold til vore instrukser:
11 respektive utrustning är förford i överensstämmelse med och följer följande standard(er) eller andra normgivande dokument, under förutsättning att användning sker i överensstämmelse med våra instruktioner:
12 respektive udstyr er i overensstemmelse med følgende standard(er) eller andre normgivende dokument(er), under forudsætning at disse brudes i henhold til vore instrukser:
13 nastavaat seuraavien standardien ja muiden ohjeellisten dokumenttien vaatimuksia edellyttäen, että niitä käytetään ohjeidemme mukaisesti:
14 za predložku, že sou využívají v souladu s našimi pokyny, odpovídají následujícím normám nebo normativním dokumentům:
15 u skladu sa slijedećim standardom(im) ili drugim normativnim dokumentom(im), uz uvjet da se oni koriste u skladu s našim uputama:

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

- 01 Directives, as amended.
02 Direktiven, med förändringar.
03 Directives, telles que modifiées.
04 Richtlijnen, zoals gewijzigd.
05 Directivas, según lo emendado.
06 Directive, come da modifica.
07 Обновили, отнюк, ъвоу промененоъ.
08 Directivas, conforme alteraçãom em.
09 Директиве со всеми поправками.
16 Megjegyzés * a(z) <A> alapján, a(z) igazolta a megfelelősé, a(z) <C> tanúsítvány szerint.
17 Uwaga * zgodnie z dokumentacją <A>, pozytywną opinią potwierdził .
18 Nota * așa cum este stabilit în <A> și anexat pozitiv în în conformitate cu Certificatul <C>.
19 Opomba * kaj bilo odobeno v <A> in odobeno s strani v skladu s izjavo v <A> a pozitivno zjeleno v skladu s certifikatom <C>.
20 Märkning * såsom i <A> beskrivet och godkänt av enligt Certifikat <C>.
21 Merk * som del förenklad av <A> och godkänt av enligt Certifikat <C>.
22 Mierk * jak bylo uvedeno v <A> a pozitivně zjišeno v souladu s osvědčením <C>.
23 Napomena * kako je izloženo u <A> pozitivno ocijenjeno od prema Certifikatu <C>.

- 17 (PL) deklaruje na własną rękę, że urządzenie, którego opis dotyczy:
18 (GB) declares under its sole responsibility that the equipment to which this declaration relates:
19 (S) deklarerar i egenskap av huvudsansvarig, att utrustningen som berörs av denna deklaration innebär att:
20 (N) erklærer et fuldstændigt ansvar for at det udstyr som berøres af denne erklæring, innebærer at:
21 (NL) imrotaaz yleistomaan omalla vastuullaan, että tämän ilmoituksen tarkoituksena on todeta:
22 (D) prohlásuje ve své plné odpovědnosti, že zařízení, k němuž se toto prohlášení vztahuje:
23 (GR) δηλώνει υπό αποκλειστική ευθύνη μου ότι ο εξοπλισμός στον οποίο αναφέρεται η παρούσα δήλωση:
24 (P) declara sob sua exclusiva responsabilidade que os equipamentos a que esta declaração se refere:

- 16 megfelelnek az alábbi szabvány(ok)nak vagy egyéb irányadó dokumentum(ok)nak, ha azokat előírás szerint használják:
17 megfelel, 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 alte) document(e) normative), cu condiția ca acestea să fie utilizate în conformitate cu instrucțiunile noastre:
19 skldning med följande standard(er) i andra) normativt dokument, under förutsättning att användning sker i överensstämmelse med våra instruktioner:
20 съответстват на следните стандарти или други нормативни документи, при условие, че се използват съгласно нашите инструкции:
22 zatímka zmanu nurobyhus standartus ir (bra)ki kitus norminius dokumentus su sąlyga, kad yra naudojami pagal mūsų nurobimus:
23 iad, ja leibti atitaisiti rozložení nortbujem, abis sekyjosem standardem an citem normativem dokumentem:
24 su u zhdie s nasledovnymi) normoujmi) alebo inymi) normativnymi) dokumentomami), za predpokladu, že sa používajú v súlade s našimi návodmi:
25 inünin, talimatlarına göre kullanılması koşullarına eşyađdaki standartlar ve norm belirlen belgelerle uyumludur:

- 10 Direktiver, med senere ændringer.
11 Direktiv, med förändringar.
12 Directives, telks que modifiées.
13 Richtlijnen, zoals gewijzigd.
14 platemn zneni.
15 Snemnice, kako je izmijenio.
16 irányelvek és módosítások rendelkezéseit.
17 változásokkal módosított irányelvek.
18 Direktivelor, cu amendamentele respective.
19 Direktive, med senere ændringer.
20 Direktiv, med förändringar.
21 Direktiven, telks que modifiées.
22 Direktives, telles que modifiées.
23 Direktives, según lo emendado.
24 Snemnice, kako je izmijenio.
25 Direktivims haterlye Yonetmeliker.

- 21 Zabeleška * kartu je izloženo v <A> u ocieneno pozitivno od prema Certifikatu <C>.
22 Pastaba * kaip nustatyta <A> ir kaip teigiamai nuslyta pagal Serifikatą <C>.
23 Poznamka * ka nrdilis <A> un atitaisiti pozitiviam veļejumam saarāta ar sertifikātu <C>.
24 Poznámka * ako bolo uvedené v <A> a pozitivne zjeleno v súlade s osvedčením <C>.
25 Not * <A> da bejrtitigi gibi ve <C> Serifikasına göre tarafından olumlu olarak değerlendirildiği gibi.



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Thank you for purchasing this product.

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



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

1. DEFINITIONS

1.1. Meaning of warnings and symbols

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



DANGER

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



WARNING

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



CAUTION

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



NOTICE

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



This symbol identifies useful tips or additional information.

Some types of danger are represented by special symbols:



Electric current.



Danger of burning and scalding.

1.2. Meaning of used terms

Installation manual:

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

Operation manual:

Instruction manual specified for a certain product or application, explaining how to operate it.

Maintenance instructions:

Instruction manual specified for a certain product or application, which explains (if relevant) how to install, configure, operate and/or maintain the product or application.

Dealer:

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

Installer:

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

User:

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

Service company:

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

Applicable legislation:

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

Accessories:

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

Optional equipment:

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

Field supply:

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

2. SAFETY CONSIDERATIONS

The precautions here, all cover very important topics, so be sure to follow them carefully.

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

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

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

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



DANGER: ELECTRICAL SHOCK

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

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

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



DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS


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

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

Warning

- Ask your dealer or qualified personnel to carry out installation work. Do not install the machine by yourself. Improper installation may result in water leakage, electric shocks or fire.
- Perform installation work in accordance with this installation manual. Improper installation may lead to water leakage, electric shocks or fire.
- Consult your local dealer regarding what to do in case of refrigerant leakage. When the unit is to be installed in a small room, it is necessary to take proper measures so that the amount of any leaked refrigerant does not exceed the concentration limit in the event of a leakage. Otherwise, this may lead to an accident due to oxygen depletion.
- Be sure to use only the specified accessories and parts for installation work. Failure to use the specified parts may result in water leakage, electric shocks, fire, or the unit falling.
- Install the unit on a foundation that can withstand its weight. Insufficient strength may result in the fall of equipment and causing injury.
- Carry out the specified installation work in consideration of strong winds, typhoons, or earthquakes. Improper installation work may result in accidents due to fall of equipment.
- Make certain that all electrical work is carried out by qualified personnel according to the applicable legislation and this installation manual, using a separate circuit. Insufficient capacity of the power supply circuit or improper electrical construction may lead to electric shocks or fire.
- Make sure that all wiring is secure, using the specified wires and ensuring that external forces do not act on the terminal connections or wires. Incomplete connection or fixing may cause a fire.
- When wiring between the indoor and outdoor units, and wiring the power supply, form the wires so that the frontside panel can be securely fastened. If the frontside panel is not in place, overheat of the terminals, electric shocks or a fire may be caused.
- If refrigerant gas leaks during installation work, ventilate the area immediately. Toxic gas may be produced if refrigerant gas comes into contact with fire.
- After completing the installation work, check to make sure that there is no leakage of refrigerant gas. Toxic gas may be produced if refrigerant gas leaks into the room and comes into contact with a source of fire, such as a fan heater, stove or cooker.
- When planning to relocate former installed units, you must first recover the refrigerant after the pump down operation. Refer to chapter "13. Pump down operation" on page 19.
- Never directly touch any accidental leaking refrigerant. This could result in severe wounds caused by frostbite.
- Be sure to install an earth leakage circuit breaker in accordance with applicable legislation. Failure to do so may cause electrical shock and fire.

Caution

- Earth the unit. Earthing resistance should be according to applicable legislation. Do not connect the earth wire to gas or water pipes, lightning conductor or telephone earth wire. Incomplete earthing may cause electric shocks. 
- Gas pipe. Ignition or explosion may occur if the gas leaks.
- Water pipe. Hard vinyl tubes are not effective earths.
- Lightning conductor or telephone earth wire. Electric potential may rise abnormally if struck by a lightning bolt.
- Install drain piping according to this installation manual to ensure good drainage, and insulate the pipe to prevent condensation. See combination table in "Possible options" on page 5. Improper drain piping may cause water leakage, and make the furnitures get wet.
- Install the indoor and outdoor units, power wire and connecting wire at least 1 meter away from televisions or radios to prevent image interference or noise. (Depending on the radio waves, a distance of 1 meter may not be sufficient to eliminate the noise.)
- Do not rinse the outdoor unit. This may cause electric shocks or fire.
- Do not install the unit in places such as the following:
 - Where there is mist of mineral oil, oil spray or vapour for example a kitchen. Plastic parts may deteriorate, and cause them to fall out or water to leak.
 - Where corrosive gas, such as sulphurous acid gas, is produced. Corrosion of copper pipes or soldered parts may cause the refrigerant to leak.
 - Where there is machinery which emits electromagnetic waves. Electromagnetic waves may disturb the control system, and cause malfunction of the equipment.
 - Where flammable gases may leak, where carbon fiber or ignitable dust is suspended in the air or where volatile flammables, such as thinner or gasoline, are handled. Such gases may cause a fire.
 - Where the air contains high levels of salt such as that near the ocean.
 - Where voltage fluctuates a lot, such as in factories.
 - In vehicles or vessels.
 - Where acidic or alkaline vapour is present.
- Do not allow a child to mount on the outdoor unit or avoid placing any object on the unit. Falling or tumbling may result in injury.
- For use of units in applications with temperature alarm settings it is advised to foresee a delay of 10 minutes for signalling the alarm in case the alarm temperature is exceeded. The unit may stop for several minutes during normal operation for "defrosting the unit", or when in "thermostat stop" operation.

3. BEFORE INSTALLATION



WARNING

Since maximum working pressure for ERHQ is 4.0 MPa or 40 bar and for ERLQ is 4.17 MPa or 41.7 bar, pipes of larger wall thickness may be required. Refer to paragraph "8.1. Selection of piping material" on page 13.

3.1. Scope of the manual

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

3.2. Precautions for R410A

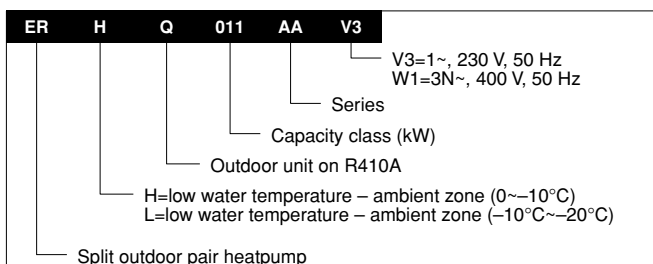
- The refrigerant requires strict cautions for keeping the system clean, dry and tight.
 - Clean and dry
 Foreign materials (including mineral oils or moisture) should be prevented from getting mixed into the system.
 - Tight
 Read "9. Precautions on refrigerant piping" on page 14 carefully and follow these procedures correctly.
- Since R410A is a mixed refrigerant, the required additional refrigerant must be charged in its liquid state. (If the refrigerant is in state of gas, its composition changes and the system will not work properly).
- The connected indoor unit must be the EKHBH/X016 unit designed exclusively for R410A.

3.3. Installation

- For installation of the indoor unit, refer to the indoor unit installation manual.
- Never operate the unit without the thermistors (R3T, R4T) or pressure sensors (S1NPH, S1PH), burning of the compressor may result.
- Be sure to confirm the model name and the serial no. of the outer (front) plates when attaching/detaching the plates to avoid mistakes.
- When closing the service panels, take care that the tightening torque does not exceed 4.1 N•m.

3.4. Model identification

ERLQ units include special equipment (insulation, bottom plate heater,...) to ensure good operation in areas where low ambient temperature can occur together with high humidity conditions. In such conditions the ERHQ models may experience problems with severe ice build up on the aircooled coil. In case such conditions are expected, the ERLQ must be installed instead. These models contain countermeasures (insulation, bottom plate heater,...) to prevent freeze up.



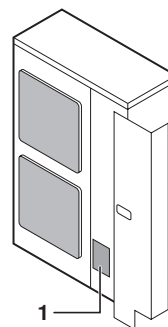
- An ERLQ_CA outdoor unit can be connected to an EKHBH/X016* indoor unit (bottom plate heater at outdoor unit is controlled by the outdoor pcb). All functionalities related to domestic hot water of an ERLQ_CA are only applicable in combination with an EKHBH/X016BB indoor unit.
- An ERHQ0*BA outdoor unit can be connected to an EKHBH/X016BB indoor unit or to an EKHBH/X016AA/AB/BA indoor unit (if a bottom plate heater kit is required, see "Possible options" on page 5).

3.5. Accessories

- Check if the following accessories are included with the unit

Installation manual	1	
Cable tie	2	
Fluorinated greenhouse gases label	1	
Multilingual fluorinated greenhouse gases label	1	
Screw (M4x12)(for ERLQ only)	1	
Thermistor fixing plate (for ERLQ only, spare)	1	
Thermistor fixture (for ERLQ only)	1	

See the figure below for the location of the accessories.



1 Accessories

■ Possible options

	Bottom plate heater	Drain socket	
!	ERLQ	Standard ^(a)	Not applicable ^(c)
	ERHQ	Optional kit ^(b)	Optional kit ^(b)

- (a) Factory mounted.
- (b) Combination of both options is prohibited.
- (c) No drain socket available for ERLQ.

	Snow cover	Demand pcb
ERLQ	EK016SNC	KRP58M51 ^(a)

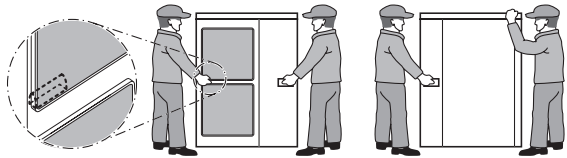
- (a) This demand pcb option is only applicable for the "setting of demand running" function.

Optional bottom plate heater (only applicable for ERHQ).

	EKBPHT16Y*	EKBPHTH16A
EKHBH/X016AA/AB	Possible	Not allowed
EKHBH/X016BA	Possible	Possible
EKHBH/X016BB	Possible	Possible

3.6. Handling

As shown in the figure below, slowly move the unit by grabbing the left and right grips. Position your hands on the corner instead of grabbing the air inlet to avoid deforming the casing.

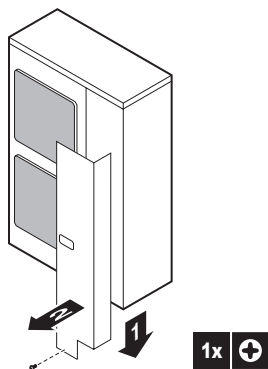


CAUTION

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

4. OVERVIEW OF UNIT

4.1. Opening the unit



DANGER: ELECTRICAL SHOCK

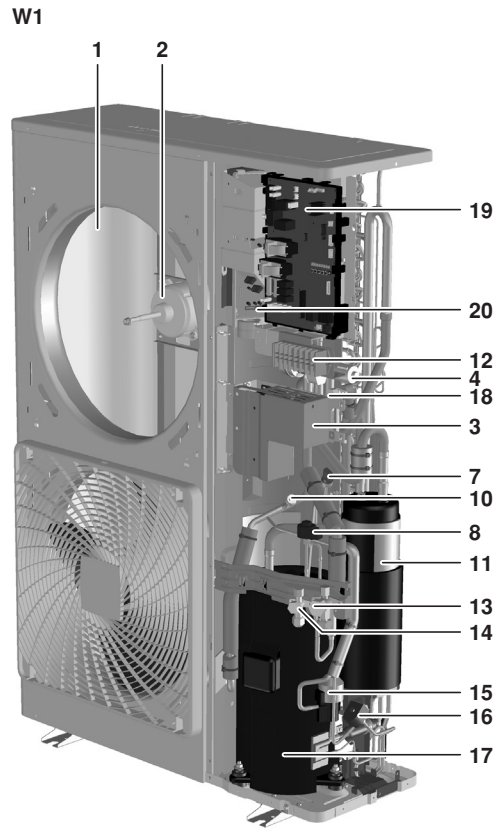
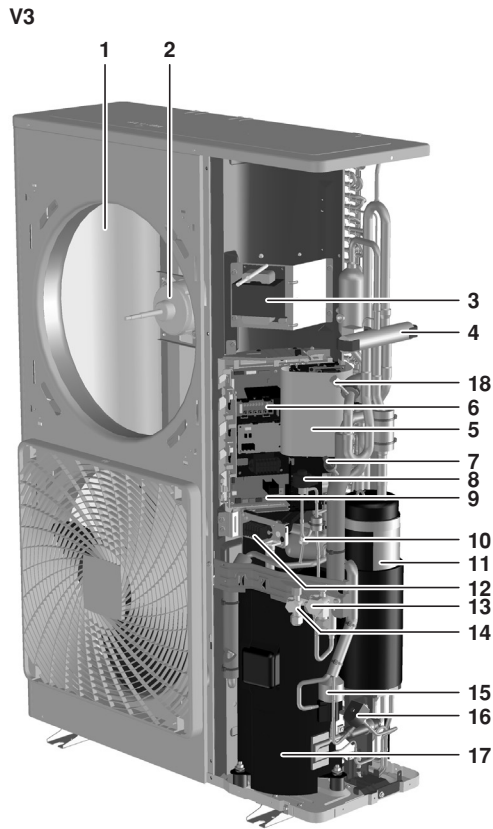
See "2. Safety considerations" on page 2.



DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS

See "2. Safety considerations" on page 2.

4.2. Main components

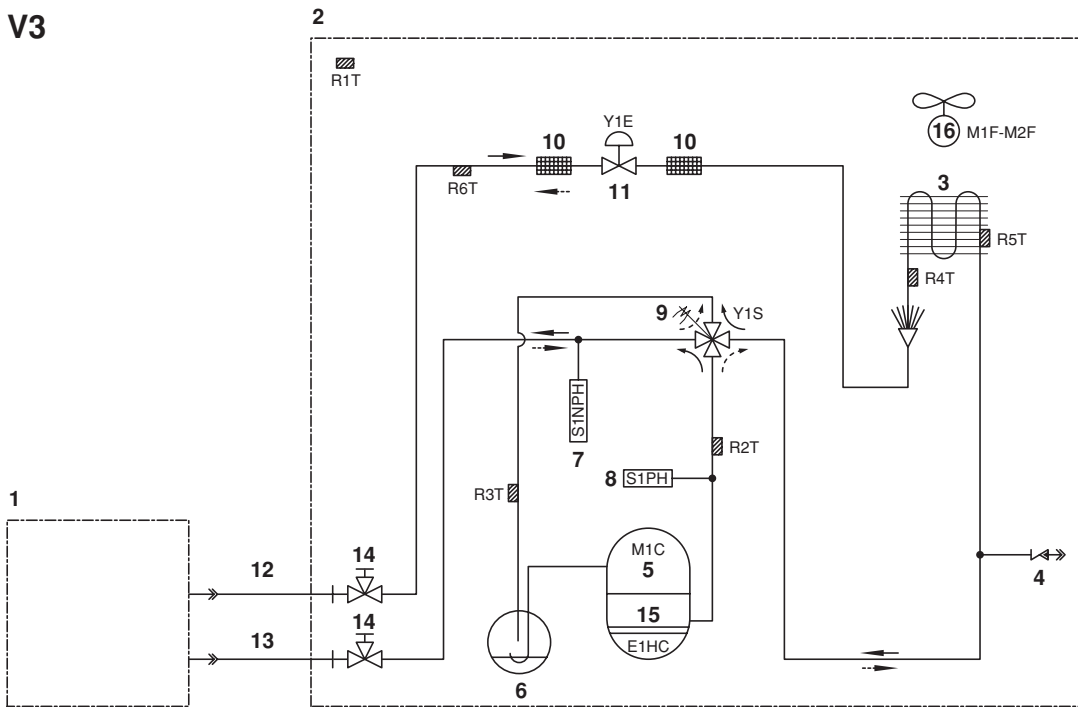


- 1 Heat exchanger
- 2 Fan motor
- 3 Reactor coil(s)
- 4 4-way valve
- 5 Noise filter pcb (only for V3 models)
- 6 Service pcb (only for V3 models)
- 7 Pressure sensor
- 8 Electronic expansion valve injection (only for ERLQ)
- 9 Main pcb (inverter and control pcb)(only for V3 models)
- 10 High pressure switch

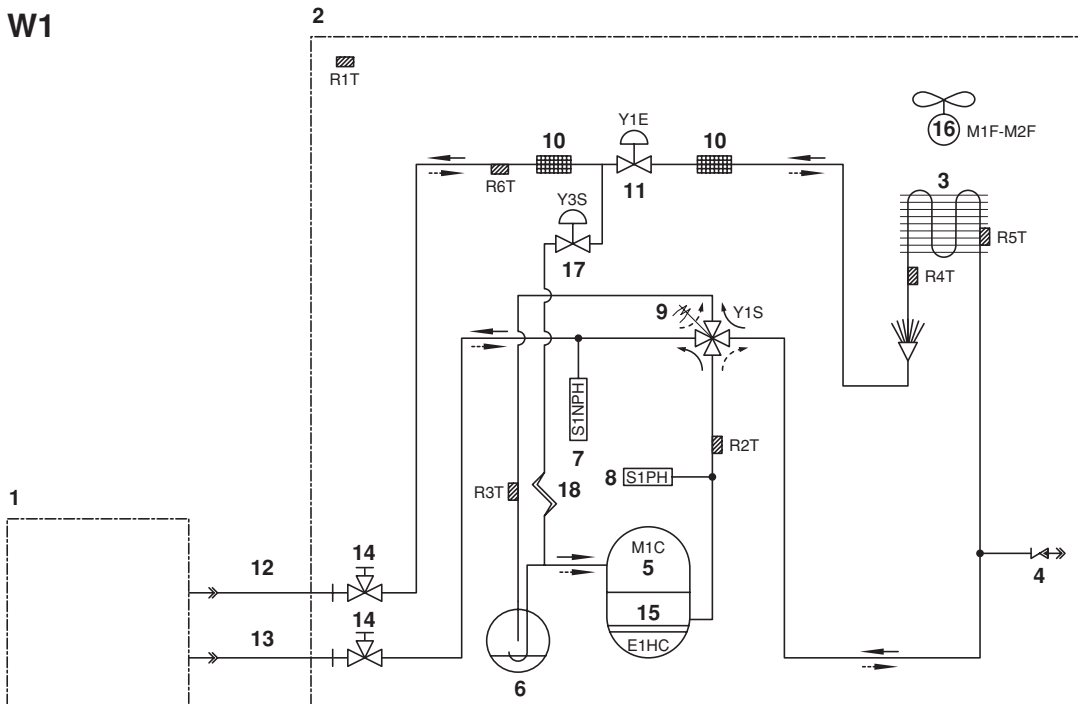
- 11 Accumulator
- 12 Terminal communication and power supply
- 13 Gas stop valve
- 14 Liquid stop valve
- 15 Electronic expansion valve (main)
- 16 Solenoid valve (hot gas pass)(only for ERLQ)
- 17 Compressor
- 18 Service port
- 19 Control pcb (noise and filter pcb)(only for W1 models)
- 20 Inverter pcb (only for W1 models)

4.3. Functional diagram ERHQ_V3+W1

V3

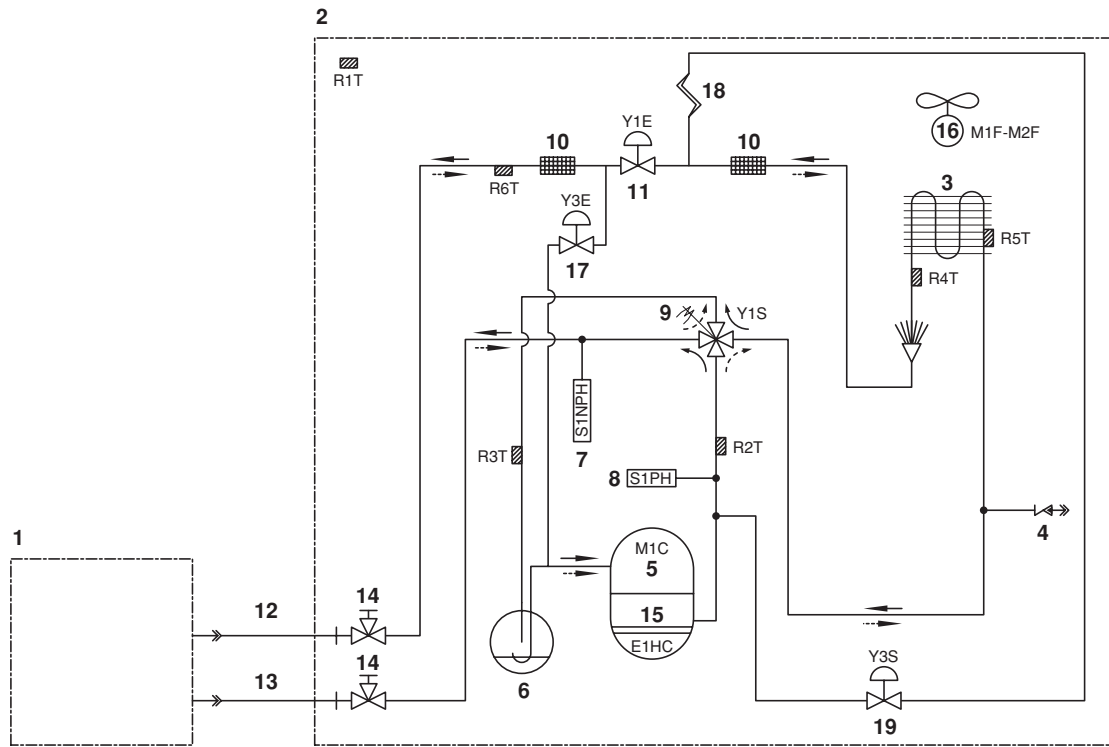


W1



- | | | | |
|----|----------------------------|-----|--------------------------------------|
| 1 | Indoor unit EKHBH/X016 | 14 | Stop valve (with service port 5/16") |
| 2 | Outdoor unit | 15 | Crank case heater |
| 3 | Heat exchanger | 16 | Fan motor |
| 4 | Service port 5/16" | 17 | Injection valve |
| 5 | Compressor | 18 | Capillary tube |
| 6 | Accumulator | R1T | Thermistor (air) |
| 7 | Pressure sensor | R2T | Thermistor (discharge) |
| 8 | High pressure switch | R3T | Thermistor (suction) |
| 9 | 4-way valve | R4T | Thermistor (heat exchanger) |
| 10 | Filter | R5T | Thermistor (heat exchanger middle) |
| 11 | Electronic expansion valve | R6T | Thermistor liquid |
| 12 | Field piping Ø9.5 | | → Heating |
| 13 | Field piping Ø15.9 | | - - - → Cooling |

4.4. Functional diagram ERLQ_V3+W1



- | | | | |
|----|--------------------------------------|---------|--|
| 1 | Indoor unit EKHBH/X016 | 15 | Crank case heater |
| 2 | Outdoor unit | 16 | Fan motor |
| 3 | Heat exchanger | 17 | Electronic expansion valve (injection) |
| 4 | Service port 5/16" | 18 | Capillary tube |
| 5 | Compressor | 19 | Solenoid valve (hot gas pass) |
| 6 | Accumulator | R1T | Thermistor (air) |
| 7 | Pressure sensor | R2T | Thermistor (discharge) |
| 8 | High pressure switch | R3T | Thermistor (suction) |
| 9 | 4-way valve | R4T | Thermistor (heat exchanger) |
| 10 | Filter | R5T | Thermistor (heat exchanger middle) |
| 11 | Electronic expansion valve (main) | R6T | Thermistor liquid |
| 12 | Field piping Ø9.5 | → | Heating |
| 13 | Field piping Ø15.9 | - - - → | Cooling |
| 14 | Stop valve (with service port 5/16") | | |

5. SELECTING INSTALLATION SITE

5.1. General



CAUTION

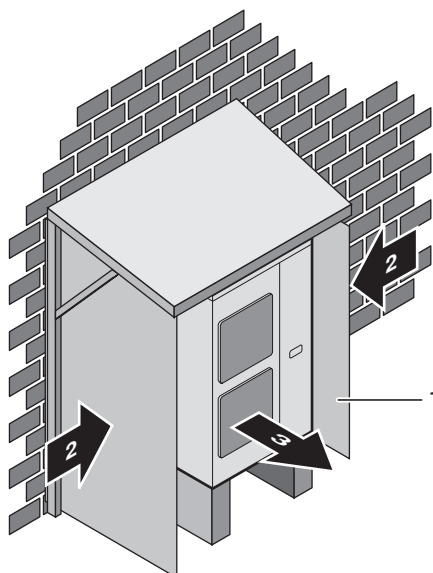
- Make sure to provide for adequate measures in order to prevent that the outdoor unit be used as a shelter by small animals.
- Small animals making contact with electrical parts can cause malfunctions, smoke or fire. Please instruct the customer to keep the area around the unit clean.

- Select an installation site where the following conditions are satisfied and that meets with your customer's approval.
 - Places which are well-ventilated.
 - Places where the unit does not bother next-door neighbours.
 - Safe places which can withstand the unit's weight and vibration and where the unit can be installed level.
 - Places where there is no possibility of flammable gas or product leak.
 - The equipment is not intended for use in a potentially explosive atmosphere.
 - Places where servicing space can be well ensured.
 - Places where the indoor and outdoor units' piping and wiring lengths come within the allowable ranges.
 - Places where water leaking from the unit cannot cause damage to the location (e.g. in case of a blocked drain pipe).
 - Places where the rain can be avoided as much as possible.
 - Do not install the unit in places often used as work place.In case of construction works (e.g. grinding works) where a lot of dust is created, the unit must be covered.
 - Do not place any objects or equipment on top of the unit (top plate).
 - Do not climb, sit or stand on top of the unit,
 - Be sure that sufficient precautions are taken, in accordance with applicable legislation, in case of refrigerant leakage.
- When installing the unit in a place exposed to strong wind, pay special attention to the following.

Strong winds of 5 m/sec or more blowing against the outdoor unit's air outlet causes short circuit (suction of discharge air), and this may have the following consequences:

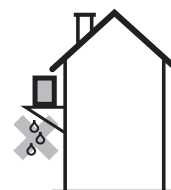
 - Deterioration of the operational capacity.
 - Frequent frost acceleration in heating operation.
 - Disruption of operation due to rise of high pressure.
 - When a strong wind blows continuously on the face of the unit, the fan can start rotating very fast until it breaks.Refer to the figures for installation of this unit in a place where the wind direction can be foreseen.

- Install a baffle plate on the air suction side of the outdoor unit and set the outlet side at a right angle to the direction of the wind:



- 1 Baffle plate
- 2 Strong wind
- 3 Discharge air

- Prepare a water drainage channel around the foundation, to drain waste water from around the unit.
- If the water drainage of the unit is not easy, please build up the unit on a foundation of concrete blocks, etc. (the height of the foundation should be maximum 150 mm).
- If you install the unit on a frame, please install a waterproof plate within 150 mm of the underside of the unit in order to prevent the invasion of water from the lower direction.
- When installing the unit in a place frequently exposed to snow, pay special attention to elevate the foundation as high as possible.
- If you install the unit on a building frame, please install a waterproof plate (field supply)(within 150 mm of the underside of the unit) or use a drain kit (refer to combination table in "Possible options" on page 5) in order to avoid the drainwater dripping. (See figure).
- Make sure that the unit is installed level.



5.2. Selecting a location in cold climates

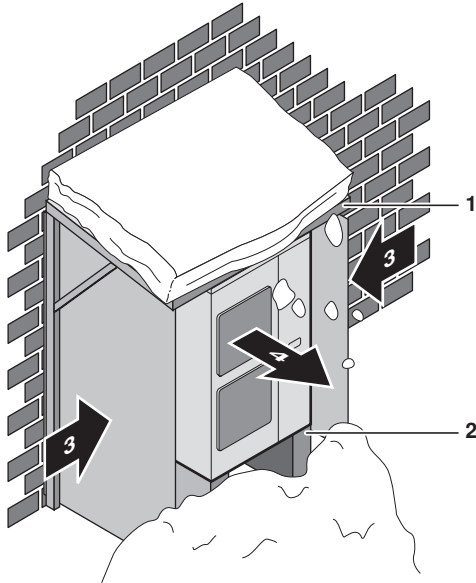
Refer to "3.4. Model identification" on page 4.



NOTICE

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

- To prevent exposure to wind, install the outdoor unit with its suction side facing the wall.
- Never install the outdoor unit at a site where the suction side may be exposed directly to wind.
- To prevent exposure to wind, install a baffle plate on the air discharge side of the outdoor unit.
- In heavy snowfall areas it is very important to select an installation site where the snow will not affect the unit and set the outlet side at a right angle to the direction of the wind:



- 1 Construct a large canopy.
- 2 Construct a pedestal. Install the unit high enough off the ground to prevent burying in snow.
- 3 Strong wind
- 4 Discharge air

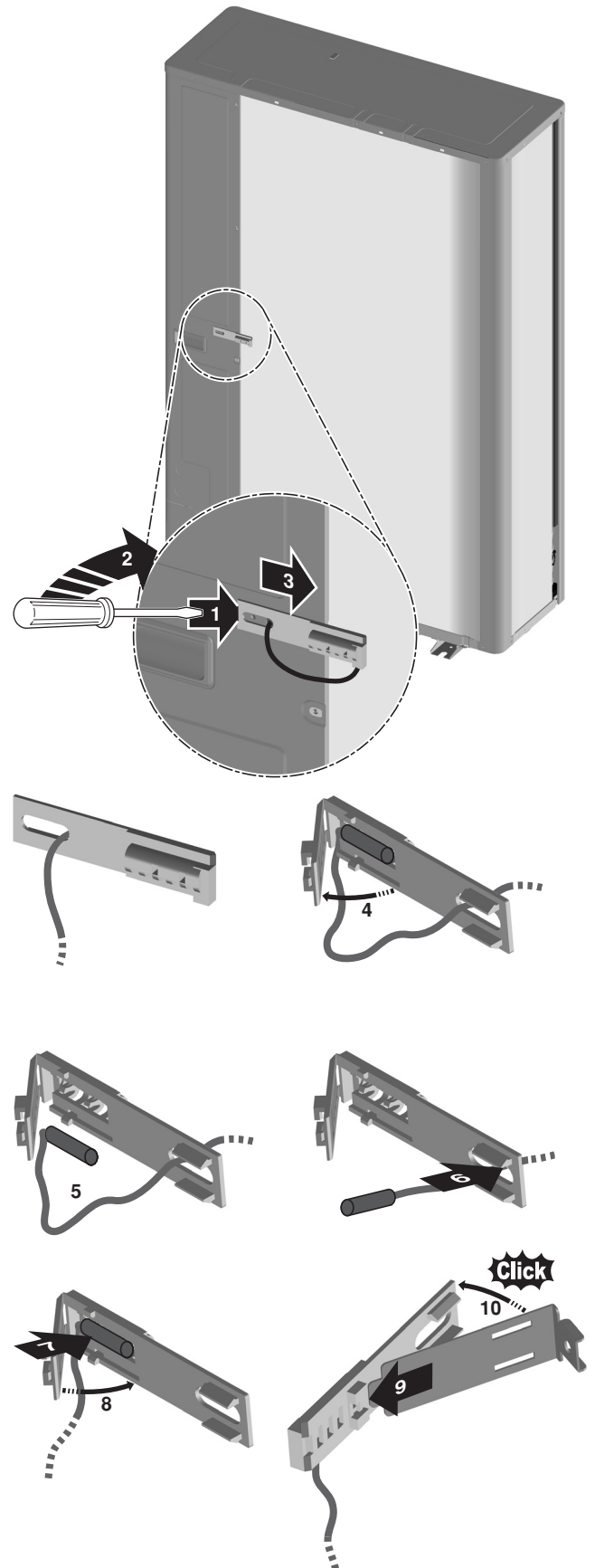


If the installation of a canopy is not possible, the optional snow cover (EK016SNC) shall be installed.

- For ERLQ only. Follow the procedure as described below for modifying the position of the air thermistor (R1T). The thermistor fixture is delivered in the accessory bag.



Spare thermistor fixing plate is delivered in the accessory bag.

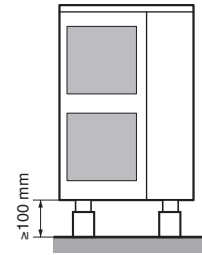


6. PRECAUTIONS ON INSTALLATION



NOTICE

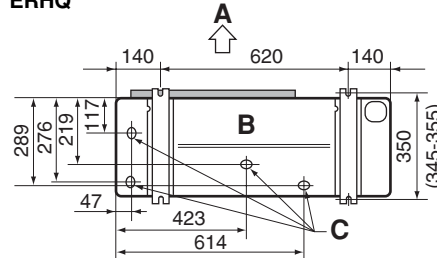
If drain holes of the outdoor unit are covered by a mounting base or by floor surface, raise the unit in order to provide a free space of more than 100 mm under the outdoor unit.



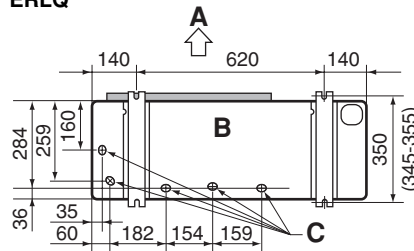
6.1. foundation work

- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- In accordance with the foundation drawing in the figure, fix the unit securely by means of the foundation bolts. (Prepare 4 sets of M12 foundation bolts, nuts and washers each which are field supplied.)
- It is best to screw in the foundation bolts until their length are 20 mm from the foundation surface.

ERHQ



ERLQ

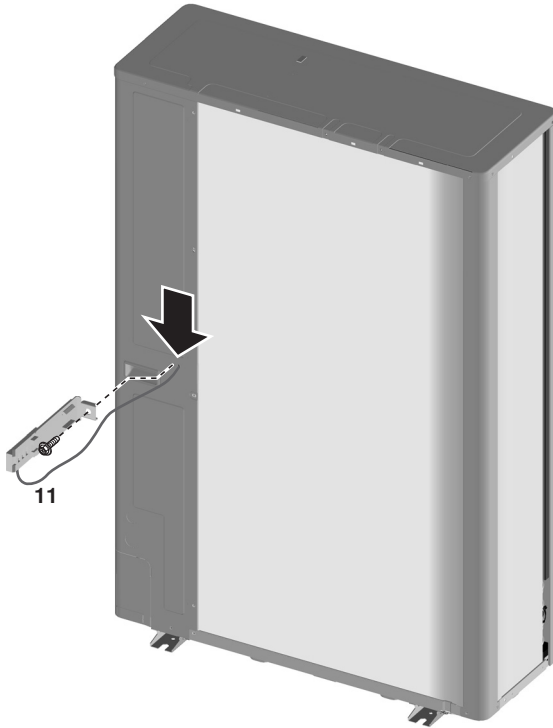
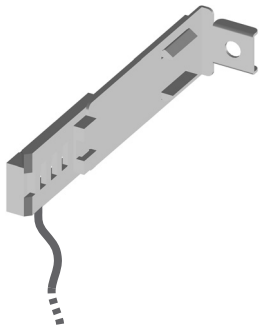


- A Discharge side
- B Bottom view (mm)
- C Drain hole

6.2. Drain work (only for ERHQ)

Check in the combination table under "Possible options" on page 5 whether drain work is allowed. In case drain work on your unit is allowed and the installation site requires drain work, then follow the guidelines below.

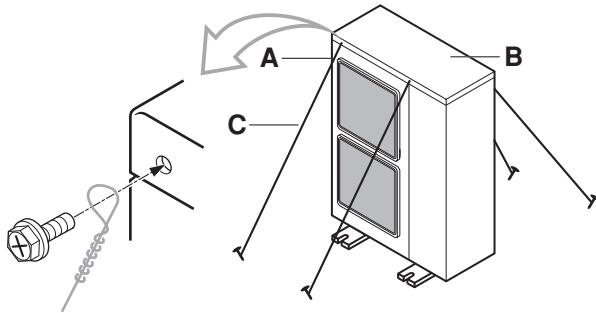
- Drain kits for drainage are available as option.
- If drain work from the outdoor unit causes trouble (for example, if the drain water may splash on people) provide the drain piping using a drain socket (optional).
- Make sure the drain works properly.



6.3. Installation method for prevention of falling over

If it is necessary to prevent the unit from falling over, install as shown in the figure.

- prepare all 4 wires as indicated in the drawing
- unscrew the top plate at the 4 locations indicated A and B
- put the screws through the nooses and screw them back tight



- A Location of the 2 fixation holes on the front side of the unit
- B Location of the 2 fixation holes on the rear side of the unit
- C Wires: field supply

7. INSTALLATION SERVICING SPACE

The numerical figures used in the figures represent the dimensions in mm.

(Refer to "6. Precautions on installation" on page 11)

Precaution

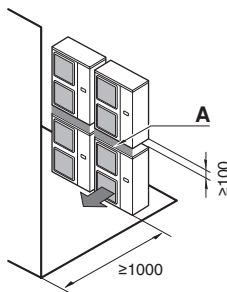
(A) In case of non-stacked installation (see figure 1 for ERHQ, see figure 1 for ERLQ)

	Suction side obstacle	✓	Obstacle is present
	Discharge side obstacle	1	In these cases, close the bottom of the installation frame to prevent the discharged air from being bypassed
	Left side obstacle	2	In these cases, only 2 units can be installed.
	Right side obstacle	3	Recommended installation setup. ^(a)
	Top side obstacle	⊗	This situation is not allowed

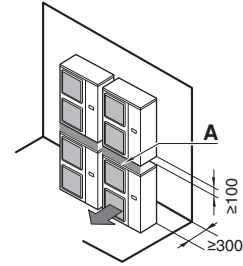
(a) Specific for ERLQ to prevent exposure to wind or that the heat exchanger coil is affected by snow.

(B) In case of stacked installation (for ERHQ only)

1. In case obstacles exist in front of the outlet side.



2. In case obstacles exist in front of the air inlet.

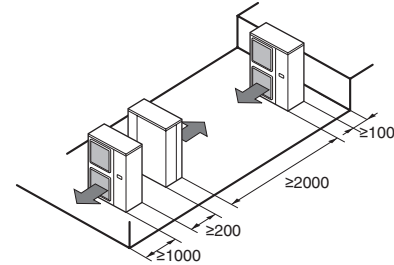


Do not stack more than one unit.

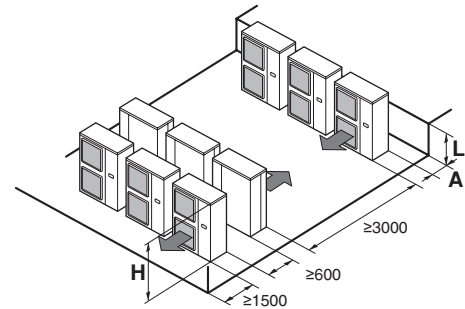
About 100 mm is required as the dimension for laying the upper outdoor unit's drain pipe. Get the portion A sealed so that air from the outlet does not bypass.

(C) In case of multiple-row installation (for roof top use, etc.)(for ERHQ only)

1. In case of installing one unit per row.



2. In case of installing multiple units (2 units or more) in lateral connection per row.



Relation of dimensions of H, A and L are shown in the table below.

	L	A
L ≤ H	0 < L ≤ 1/2H	250
	1/2H < L	300
H < L	Installation not allowed	

8. REFRIGERANT PIPE SIZE AND ALLOWABLE PIPE LENGTH



DANGER

- Piping and other pressure containing parts shall comply with the applicable legislation and shall be suitable for refrigerant. Use phosphoric acid deoxidised seamless copper for refrigerant.
- Installation shall be done by a licensed refrigerant technician, the choice of materials and installation shall comply with applicable legislation. In Europe the EN378 is the application standard that shall be used.



NOTICE

To persons in charge of piping work:

Be sure to open the stop valve after piping installing and vacuuming is complete. (Running the system with the valve closed may break the compressor.)



It is forbidden to discharge refrigerant into the atmosphere. Collect the refrigerant in accordance with the freon collection and destruction law.

8.1. Selection of piping material

- Construction material: phosphoric acid deoxidised seamless copper for refrigerant.
- Temper grade: use piping with temper grade in function of the pipe diameter as listed in table below.
- The pipe thickness of the refrigerant piping should comply with applicable legislation. The minimal pipe thickness for R410A piping must be in accordance with the table below.

Pipe Ø	Temper grade of piping material	Minimal thickness t (mm)
9.5	O	0.80
15.9	O	1.00

O=Annealed

8.2. Refrigerant pipe size

The pipes between outdoor unit and indoor unit should have the same size as the outdoor connections.

Refrigerant pipe size (mm)	
Gas pipe	Ø15.9
Liquid pipe	Ø9.5

8.3. Allowable pipe length and height difference

See the table below concerning allowable lengths and heights. Refer to figure 2. Assume that the longest line in the figure corresponds with the actual longest pipe, and the highest unit in the figure corresponds with the actual highest unit.

For ERHQ only

Allowable pipe length	V3	W1
Maximum total one-way piping length ^(a)		
L	75 m (95 m)	
Maximum height between indoor and outdoor		
H	30 m	
Chargeless length		
L	≤30 m	≤10 m

(a) Parenthesized figure represents the equivalent length.

For ERLQ only

Allowable pipe length	V3	W1
Maximum total one-way piping length ^(a)		
L	50 m (70 m)	
Maximum height between indoor and outdoor		
H	30 m	
Chargeless length		
L	≤10 m	

(a) Parenthesized figure represents the equivalent length.

9. PRECAUTIONS ON REFRIGERANT PIPING

- Do not allow anything other than the designated refrigerant to get mixed into the freezing cycle, such as air, etc. If any refrigerant gas leaks while working on the unit, ventilate the room thoroughly right away.

- Use R410A only when adding refrigerant

Installation tools:

Make sure to use installation tools (gauge manifold charge hose, etc.) that are exclusively used for R410A installations to withstand the pressure and to prevent foreign materials (e.g. mineral oils and moisture) from mixing into the system.

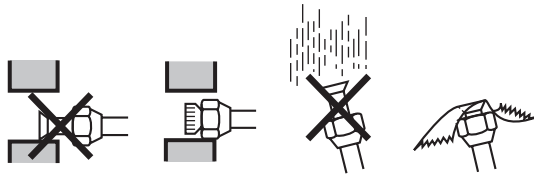
Vacuum pump:

Use a 2-stage vacuum pump with a non-return valve

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

Use a vacuum pump which can evacuate to -100.7 kPa (5 Torr, -755 mm Hg).

- In order to prevent dirt, liquid or dust from entering the piping, cure the piping with a pinch or taping. Great caution is needed when passing copper tubes through walls.



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

- Piping should be mounted so that the flare is not subjected to mechanical stress.

9.1. Flaring guidelines

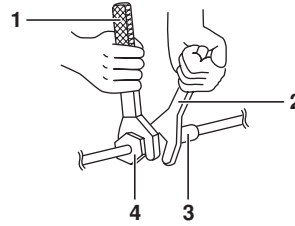
- Flares should not be re-used. New ones should be made in order to prevent leaks.
- Use a pipe cutter and flare tool suitable for the refrigerant used.
- Only use the flare nuts included with the unit. Using different flare nuts may cause the refrigerant to leak.
- Please refer to the table for flaring dimensions and tightening torques (too much tightening will result in splitting the flare).

Piping size (mm)	Tightening torque (N·m)	Flare dimensions A (mm)	Flare shape (mm)
Ø9.5	33~39	12.8~13.2	
Ø15.9	63~75	19.4~19.7	

- When connecting the flare nut, coat the flare inner surface with ether oil or with ester oil and initially tighten 3 or 4 turns by hand before tightening firmly.



- When loosening a flare nut, always use two wrenches together. When connecting the piping, always use a spanner and torque wrench together to tighten the flare nut to prevent flare nut cracking and leaks.



- Torque wrench
- Spanner
- Piping union
- Flare nut

Not recommended, but in case of emergency

Should you be forced to connect the piping without a torque wrench, follow the following installation method:

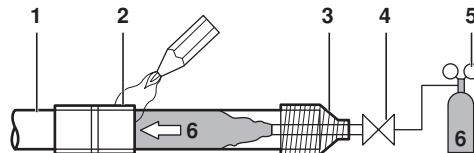
- Tighten the flare nut using a spanner until the tightening torque suddenly increases.

- From that position further tighten the flare nut to the angle listed below:

Piping size (mm)	Further tightening angle (degrees)	Recommended arm length of spanner (mm)
Ø9.5	60~90	±200
Ø15.9	30~60	±300

9.2. Brazing guidelines

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



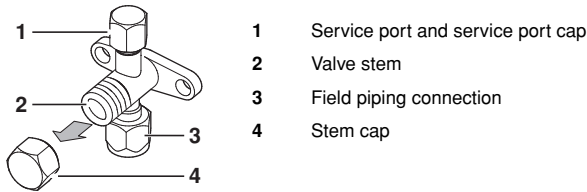
- Refrigerant piping
- Part to be brazed
- Taping
- Manual valve
- Pressure-reducing valve
- Nitrogen

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

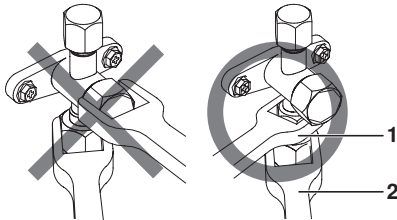
9.3. Stop valve operation

Cautions on handling the stop valve

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



- The stop valve is factory closed.
- Do not apply excessive force to the valve stem. Doing so may break the valve body.
- Since the stop valve attachment plate may be deformed if only a torque wrench is used to loosen or tighten the flare nut, always make sure to secure the stop valve with a spanner, then loosen or tighten the flare nut with a torque wrench. Do not place the spanner on the stem cap, as this could cause a refrigerant leak.



- 1 Spanner
- 2 Torque wrench

- When it is expected that the operating pressure will be low (for example, when cooling will be performed while the outside air temperature is low), sufficiently seal the flare nut in the stop valve on the gas line with silicon sealant to prevent freezing.



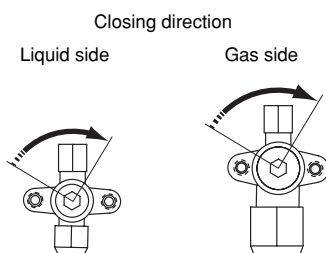
Opening/closing the stop valve

Opening the stop valve

1. Remove the valve cover.
2. Insert a hexagon wrench (liquid side: 4 mm/gas side: 6 mm) into the valve stem and turn the valve stem counterclockwise.
3. When the valve stem cannot be turned any further, stop turning. The valve is now open.

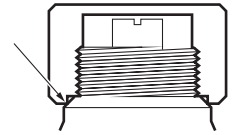
Closing the stop valve

1. Remove the valve cover.
2. Insert a hexagon wrench (liquid side: 4 mm/gas side: 6 mm) into the valve stem and turn the valve stem clockwise.
3. When the valve stem cannot be turned any further, stop turning. The valve is now closed.



Cautions on handling the stem cap

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



Cautions on handling the service port

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

9.4. Tightening torques

Item	Tightening torque (N·m)
Stem cap, liquid side	13.5~16.5
Stem cap, gas side	22.5~27.5
Service port cap	11.5~13.9

10. REFRIGERANT PIPING

- Field pipes can be installed in four directions (A, B, C, D).

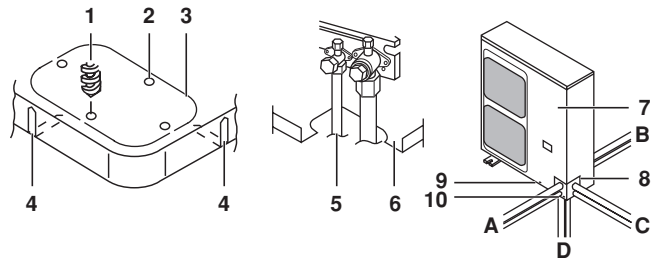
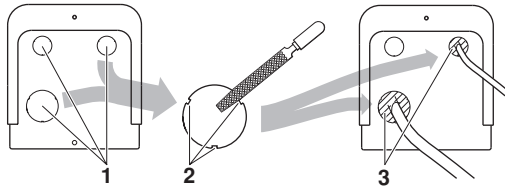


Figure - Field pipes in 4 directions

- 1 Drill
- 2 Centre area around knockout hole
- 3 Knockout hole
- 4 Slit
- 5 Connecting pipe
- 6 Bottom frame
- 7 Front plate
- 8 Pipe outlet plate
- 9 Screw front plate
- 10 Pipe outlet plate screw
- A Forward
- B Backward
- C Sideways
- D Downward

- Cutting out the two slits makes it possible to install as shown in the figure "Field pipes in 4 directions". (Use a metal saw to cut out the slits.)
- To install the connecting pipe to the unit in a downward direction, make a knockout hole by penetrating the centre area around the knockout hole using a Ø6 mm drill (4x). (See figure "Field pipes in 4 directions".)
- After knocking out the knockout hole, it is recommended to apply repair paint to the edge and the surrounding end surfaces to prevent rusting.

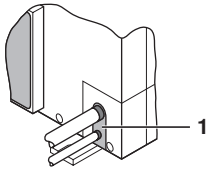
- When passing electrical wiring through the knockout holes, remove any burrs from the knockout holes and wrap the wiring with protective tape to prevent damage.



- 1 Knockout hole
- 2 Burr
- 3 Packing materials

10.1. Preventing foreign objects from entering

Plug the pipe through-holes with putty or insulating material (procured locally) to stop up all gaps, as shown in the figure.



- 1 Putty or insulating material (produced locally)

If there is any possibility that small animals enter the system through the knockout holes, plug the holes with packing materials (field supplied).

Insects or small animals entering the outdoor unit may cause a short circuit in the electrical box.

In cold climates, seal knockout holes to avoid entrance of snow and humidity.

10.2. Precautions when connecting field piping and regarding insulation

- Be careful not to let the indoor and outdoor piping come into contact with the compressor terminal cover. If the liquid-side piping insulation might come into contact with it, adjust the height as shown in the figure below. Also, make sure the field piping does not touch the bolts or outer panels of the compressor.
- When the outdoor unit is installed above the indoor unit the following can occur:
The condensed water on the stop valve can move to the indoor unit. To avoid this, please cover the stop valve with sealing material.
- If the temperature is higher than 30°C and the humidity is higher than RH 80%, then the thickness of the sealing materials should be at least 20 mm in order to avoid condensation on the surface of the sealing.
- Be sure to insulate the liquid and gas-side field piping.



NOTICE

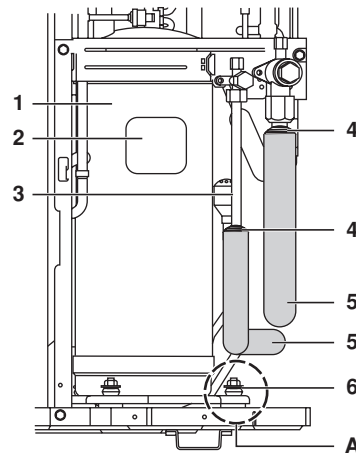
Any exposed piping may cause condensation.

(The highest temperature that the gas-side piping can reach is around 120°C, so be sure to use insulating material which is very resistant.)



DANGER

Do not touch piping and internal parts.



- 1 Compressor
- 2 Terminal cover
- 3 Indoor and outdoor field piping
- 4 Corking, etc.
- 5 Insulation material
- 6 Bolts
- A Be careful with pipe, bolt and outer panel connections

10.3. Cautions for necessity of a trap

To avoid the risk of oil held inside the riser piping flowing back into the compressor when stopped and causing liquid compression phenomenon, or cases of deterioration of oil return, it will be necessary to provide a trap at each difference in height of 10 m in the riser gas piping.

- Trap installation spacing. (See figure 4)

- A Outdoor unit
- B Indoor unit
- C Gas piping
- D Liquid piping
- E Oiltrap
- H Install trap at each difference in height of 10 m.

- A trap is not necessary when the outdoor unit is installed at higher position than the indoor unit.

11. LEAK TEST AND VACUUM DRYING

When all piping work is complete and the outdoor unit is connected to the indoor unit, it is necessary to:

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

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

11.1. General guidelines

- All piping inside the unit has been factory tested for leaks.
- Use a 2-stage vacuum pump with a non-return valve which can evacuate to a gauge pressure of -100.7 kPa (5 Torr absolute, -755 mm Hg).
- Connect the vacuum pump to **both** the service port of the gas stop valve and the liquid stop valve to increase efficiency.



NOTICE

- Do not purge the air with refrigerants. Use a vacuum pump to evacuate the installation. No additional refrigerant is provided for air purging.
- Make sure that the gas stop valve and liquid stop valve are firmly closed before performing the leak test or vacuum drying.

11.2. Setup

(See figure 5)

- 1 Pressure gauge
- 2 Nitrogen
- 3 Refrigerant
- 4 Weighing machine
- 5 Vacuum pump
- 6 Stop valve

11.3. Leak test

The leak test must satisfy specification EN 378-2.

- 1 Vacuum leak test
 - 1.1 Evacuate the system from the liquid and gas piping to -100.7 kPa (5 Torr).
 - 1.2 Once reached, turn off the vacuum pump and check that the pressure does not rise for at least 1 minute.
 - 1.3 Should the pressure rise, the system may either contain moisture (see vacuum drying below) or have leaks.
- 2 Pressure leak test
 - 2.1 Break the vacuum by pressurizing with nitrogen gas to a minimum gauge pressure of 0.2 MPa (2 bar). Never set the gauge pressure higher than the maximum operation pressure of the unit, i.e. 4.0 MPa (40 bar).
 - 2.2 Test for leaks by applying a bubble test solution to all piping connections.



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).

- 2.3 Discharge all nitrogen gas.

11.4. Vacuum drying

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

- 1 Evacuate the system for at least 2 hours to a target vacuum of -100.7 kPa.
- 2 Check that, with the vacuum pump turned off, the target vacuum is maintained for at least 1 hour.
- 3 Should you fail to reach the target vacuum within 2 hours or maintain the vacuum for 1 hour, the system may contain too much moisture.
- 4 In that case, break the vacuum by pressurizing with nitrogen gas to a gauge pressure of 0.05 MPa (0.5 bar) and repeat steps 1 to 3 until all moisture has been removed.
- 5 The stop valves can now be opened, and/or additional refrigerant can be charged (see "12. Charging refrigerant" on page 17).



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

12. CHARGING REFRIGERANT

12.1. Important information regarding the refrigerant used

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

Refrigerant type: R410A

GWP⁽¹⁾ value: 1975

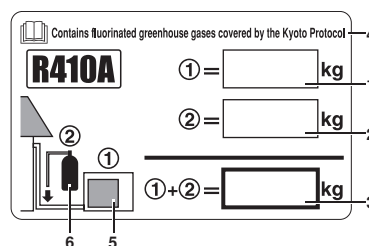
⁽¹⁾ GWP = global warming potential

Please fill in with indelible ink,

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

on the fluorinated greenhouse gases label supplied with the product.

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



- 1 Factory refrigerant charge of the product: see unit name plate
- 2 Additional refrigerant amount charged in the field
- 3 Total refrigerant charge
- 4 Contains fluorinated greenhouse gases covered by the Kyoto Protocol
- 5 Outdoor unit
- 6 Refrigerant cylinder and manifold for charging



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

Sticking instructions are illustrated on the backside of that label.

To avoid compressor breakdown. Do not charge the refrigerant more than the specified amount.

- This outdoor unit is factory charged with refrigerant and depending on pipe sizes and pipe lengths some systems require additional charging of refrigerant. See "12.4. Calculating the additional refrigerant charge for ERLQ models" on page 18.
- In case re-charge is required, refer to "12.5. Complete recharging" on page 19.

12.2. Precautions and general guidelines

- When servicing the unit requires the refrigerant system to be opened, treatment and evacuation of refrigerant must be done in accordance with applicable legislation.
- Refrigerant can not be charged until field wiring has been completed.
- Refrigerant may only be charged after performing the leak test and vacuum drying (see "11. Leak test and vacuum drying" on page 17).



CAUTION

When charging a system, care shall be taken that its maximum permissible charge is never exceeded, in view of the danger of liquid hammer.



WARNING

- Refrigerant cylinders shall be opened slowly.
- Always use protective gloves and protect your eyes when charging refrigerant.

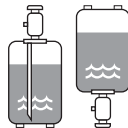


DANGER

- When the power is on, please close the front panel when leaving the unit unattended.
- Charging with an unsuitable substance may cause explosions and accidents, so always ensure that the appropriate refrigerant (R410A) is charged.

- This unit requires additional charging of refrigerant according to the length of refrigerant piping connected at the site.
- Make sure to charge the refrigerant in liquid state to the liquid pipe. Since R410A is a mixed refrigerant, its composition changes if charged in its gaseous state and normal system operation would then no longer be assured.
- Before charging, check whether the refrigerant cylinder has a syphon attached or not and position the cylinder accordingly.

Filling using a cylinder with a siphon attached
Charge the liquid refrigerant with the cylinder in upright position.



Filling using a cylinder without a siphon attached
Charge the liquid refrigerant with the cylinder in up-side-down position.

12.3. Calculating the additional refrigerant charge for ERHQ models



NOTICE

Piping length is the one way length of liquid piping.

For V3 models

It is not necessary to charge additionally if the piping length is under 30 m.

However, if the piping length is under 5 m, a complete recharging of the unit is required. Refer to "12.5. Complete recharging" on page 19.

If the piping length is over 30 m please determine the additional amount of refrigerant to be charged using the table below.

Table 1: Additional charging of refrigerant <unit: kg>

Refrigerant piping length					
3~5 m	5~30 m	30~40 m	40~50 m	50~60 m	60~75 m
(a)	(b)	0.5	1.0	1.5	2.0

- (a) Recharge required, refer to "12.5. Complete recharging" on page 19
- (b) Additional charge not required

For W1 models

It is not necessary to charge additionally if the piping length is under 10 m.

If the piping length is over 10 m please determine the additional amount of refrigerant to be charged using the table below.

Table 2: Additional charging of refrigerant <unit: kg>

Refrigerant piping length						
3~10 m	10~20 m	20~30 m	30~40 m	40~50 m	50~60 m	60~75 m
(a)	0.5	1	1.5	2	2.5	3.0

- (a) Additional charge not required

12.4. Calculating the additional refrigerant charge for ERLQ models



NOTICE

Piping length is the one way length of liquid piping.

It is not necessary to charge additionally if the piping length is under 10 m.

If the piping length is over 10 m please determine the additional amount of refrigerant to be charged using the formula below.

$$R = (\text{total length (m) of liquid piping} - 10 \text{ m}) \times 0.054$$

$$R = \text{additional charge (kg)} (\text{rounded in units of } 0.1 \text{ kg})$$

12.5. Complete recharging



NOTICE

Before recharging, make sure to execute vacuum drying of the internal piping of the unit as well. To do so, use the internal service port of the unit. Do NOT use the service ports located on the stop valve (see "9.3. Stop valve operation" on page 15), since vacuum drying can not be performed properly from these ports. Outdoor units have 1 port on the piping. It is between the heat exchanger and the 4-way valve.

In case complete recharging is required (after a leak, etc.), refer to the information below to determine the necessary amount of refrigerant.

For ERHQ only

Table 3: Total charging amount <unit: kg>

	Refrigerant piping length						
	3~10 m	10~20 m	20~30 m	30~40 m	40~50 m	50~60 m	60~75 m
V3	2.7	3.2	3.7	4.2	4.7	5.2	5.7
W1	2.95	3.45	3.95	4.45	4.95	5.45	5.95

For ERLQ only

Total charging amount <unit: kg>

Charge of refrigerant (kg) depends on total liquid piping length.

Total refrigerant charge = 3.4 kg + (total length (m) of liquid piping – 10 m) x 0.054

Remark: Factory refrigerant charge is 3.4 kg

13. PUMP DOWN OPERATION

This unit is equipped with an automatic pump down operation which will collect all refrigerant from the field piping and indoor unit in the outdoor unit. To protect the environment, make sure to perform the following pump down operation when relocating or disposing of the unit.



For more details, refer to the applicable service manual.



WARNING

The outdoor unit is equipped with a low pressure switch or a low pressure sensor to protect the compressor by switching it off. Never short-circuit the low pressure switch during pump down operation!



NOTICE

Before pumpdown is activated be sure that the water temperature and water volume is sufficiently high. Pumpdown is done in "cooling mode". See installation manual of the indoor unit for more details.

- 1 Turn on the main power supply switch.
- 2 Make sure the liquid stop valve and the gas stop valve are open (see "9.3. Stop valve operation" on page 15).
- 3 Press the pump down button (BS4) on the PCB of the outdoor unit for at least 8 seconds.
- 4 The compressor and outdoor unit fan will start operating automatically.
- 5 Once operation stops (after 3 to 5 minutes), close the liquid stop valve and the gas stop valve.

- 6 The pump down operation is now finished. The remote controller may display "U4" and the indoor pump may continue operating. This is not a malfunction. Even when the ON button on the remote controller is pressed, the unit will not start to operate. To restart operation of the unit turn off the main power supply switch and turn it on again.
- 7 Turn off the main power supply switch.



WARNING

Make sure to re-open both stop valves before restarting operation of the unit.

14. ELECTRICAL WIRING WORK



WARNING

- All wiring must be performed by an authorized electrician.
- All components procured on the site and all electric construction shall comply with the applicable legislation.



DANGER: HIGH VOLTAGE

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



NOTICE

To persons in charge of electrical wiring work:

Do not operate the unit until the refrigerant piping is complete. (Running it before the piping is ready will break the compressor.)

14.1. Precautions on electrical wiring work



DANGER

- Before obtaining access to terminal devices, all supply circuits must be interrupted.
- Be sure to install an earth leakage circuit breaker in accordance with applicable legislation. Failure to do so may cause electrical shock.

- Use only copper wires.
- A main switch or other means for disconnection, having a contact separation in all poles, must be incorporated in the fixed wiring in accordance with applicable legislation. Do not turn on the main switch until all the wiring is completed.
- Never squeeze bundled cables into a unit.
- Fix cables so that cables do not make contact with the pipes (especially on high pressure side).
- Secure the electrical wiring with cable ties as shown in the figure in chapter "14.2. Connecting power supply and interunit wiring" on page 20 so that it does not come in contact with the piping, particularly on the high-pressure side. Make sure no external pressure is applied to the terminal connectors.
- When installing the earth leakage circuit breaker make sure that it is compatible with the inverter (resistant to high frequency electrical noise) to avoid unnecessary opening of the earth leakage circuit breaker.

- As this unit is equipped with an inverter, installing a phase advancing capacitor not only will deteriorate power factor improvement effect, but also may cause capacitor abnormal heating accident due to high-frequency waves. Therefore, never install a phase advancing capacitor.

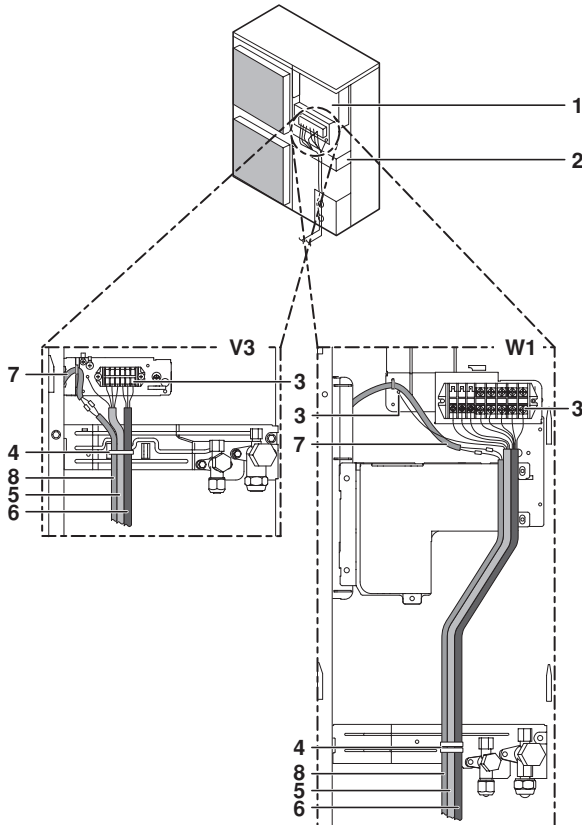


CAUTION

Be sure to install the required fuses or circuit breakers.

14.2. Connecting power supply and interunit wiring

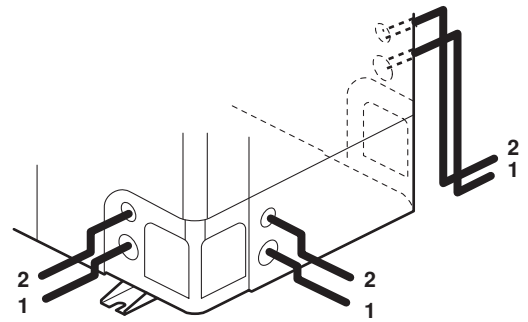
- Secure the earth wire to the stop valve attachment plate so that it does not slide.
- Secure the earth wire to the stop valve attachment plate one more time along with the electric wiring and the inter-unit wiring.
- Lay the electrical wiring so that the front cover does not rise up when doing wiring work and attach the front cover securely.



- 1 Switch box
 - 2 Stop valve attachment plate
 - 3 Earth
 - 4 Cable tie
 - 5 Wiring between units
 - 6 Power supply and earth wiring
- Only if bottom plate heater applicable (optional for ERHQ)
- 7 Bottom plate heater cable
 - 8 Power supply of bottom plate heater (from indoor unit)



ERLQ units control the bottom plate heater internally (no field wiring applicable).



- 1 Power supply, earth wiring, and if applicable: bottom plate heater wire
- 2 Wiring between unit

- When cables are routed from the unit, a protection sleeve for the conduits (PG-insertions) can be inserted at the knockout hole. (See figure 3)

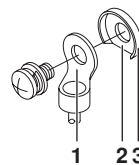
- 1 Wire
- 2 Bush
- 3 Nut
- 4 Frame
- 5 Hose
- A Inside
- B Outside

When you do not use a wire conduit, be sure to protect the wires with vinyl tubes to prevent the edge of the knockout hole from cutting the wires.

- Follow the electric wiring diagram for electrical wiring works (delivered with the unit, located at the inside of the front plate).
- Form the wires and fix the cover firmly so that the cover may be fit in properly.

14.3. Precautions on wiring of power supply and inter-unit wiring

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



- 1 Round pressure terminal
- 2 Cut out section
- 3 Cup washer

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



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

Tightening torque (N·m)	
M4 (X1M)	1.2~1.8
M5 (X1M)	2.0~3.0
M5 (EARTH)	3.0~4.0

- Refer to the installation manual attached to the indoor unit for wiring of indoor unit, etc.
- Attach an earth leakage circuit breaker and fuse to the power supply line. (See figure 6)
 - 1 Earth leakage circuit breaker
 - 2 Fuse
 - 3 Remote controller
- In wiring, make certain that prescribed wires are used, carry out complete connections, and fix the wires so that outside forces are not applied to the terminals.

14.4. Electrical characteristics

	ERHQ_V3	ERLQ_V3	ERHQ_W1	ERLQ_W1
Phase and frequency	1~ 50 Hz		3N~ 50 Hz	
Voltage	230 V		400 V	
Recommended field fuse	32 A	40 A	20 A	
Minimum circuit amps ^(a)	28.2 A	34.2 A	13.5 A	16.3 A
Wire type of wiring between the units	Minimum cable section of 2.5 mm ² and applicable for 230 V			

(a) Stated values are maximum values (see electrical data of combination with indoor unit for exact values).



CAUTION

Select all cables and wire sizes in accordance with applicable legislation.



CAUTION

After finishing the electrical work, confirm that each electric part and terminal inside the electric part box is connected securely.

ERHQ models

For V3 models: Equipment complying with EN/IEC 61000-3-12⁽¹⁾

ERLQ models

For V3 models: This equipment complies with respectively:

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

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

- a system impedance Z_{sys} less than or equal to Z_{max} and
- a short-circuit power S_{sc} greater than or equal to the minimum S_{sc} value.

	Z_{max} (Ω)	Minimum S_{sc} value
ERLQ011CAV3	0.22	525 kVA
ERLQ014CAV3	0.22	525 kVA
ERLQ016CAV3	0.22	525 kVA

For W1 models: Equipment complying with EN/IEC 61000-3-12⁽¹⁾

The wiring diagram can be found on the inside of the front plate of the unit.

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

15. TEST OPERATION



DANGER

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



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

15.1. Pre-run checks

Items to check	
Electrical wiring Inter-unit wiring Earth wire	<ul style="list-style-type: none"> ■ Is the wiring as mentioned on the wiring diagram? Make sure no wiring has been forgotten and that there are no missing phases. ■ Is the unit properly earthed? ■ Is the wiring between units connected in series correct? ■ Are any of the wiring attachment screws loose? ■ Is the insulation resistance at least 1 MΩ? <ul style="list-style-type: none"> - Use a 500 V mega-tester when measuring insulation. - Do not use a mega-tester for low-voltage circuits.
Refrigerant piping	<ul style="list-style-type: none"> ■ Is the size of the piping appropriate? ■ Is the insulation material for the piping attached securely? <ul style="list-style-type: none"> Are both the liquid and gas pipes insulated? ■ Are the stop valves for both the liquid side and the gas side open?
Extra refrigerant	<ul style="list-style-type: none"> ■ Did you write down the extra refrigerant and the refrigerant piping length?

- Be sure to perform a test run.
- Be sure to fully open the liquid-side and gas-side stop valves. If you operate the unit with stop valves closed, the compressor will break down.
- Never leave the unit unattended with an open front panel during test run.
- To protect the compressor, make sure to turn on the power supply 6 hours before starting operation.
- During tests never pressurize the applications with a pressure higher than the maximum allowable pressure (indicated on the name plate of the unit).

15.2. Test run

Carry out the test run in accordance with the indoor installation manual to ensure that all functions and parts are working properly.

15.3. Failure diagnosis at the moment of first installation

- In case nothing is displayed on the remote controller (the current set temperature does not display), check for any of the following abnormalities before you can diagnose possible malfunction codes.
 - Disconnection or wiring error (between power supply and outdoor unit, between outdoor unit and indoor units, between indoor unit and remote controller).
 - The fuse on the outdoor unit PCB may have run out.
- If the remote controller shows "E3", "E4" or "LB" as an error code, there is a possibility that either the stop valves are closed, or that air inlet or air outlet are blocked.
- If the error code "L2" is displayed on the remote controller, check for voltage imbalance.
- If the error code "L4" is displayed on the remote controller, it is possible that air inlet or air outlet are blocked.
- For a missing phase in case of W1 units, "E7" or "L2" will be displayed on the remote controller of the indoor unit. Operation will be impossible with either one of these phenomena. If this happens, turn off the power, re-check the wiring and switch the position of two of the three electrical wires.

16. MAINTENANCE AND SERVICING

16.1. Service precautions

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

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



DANGER: ELECTRICAL SHOCK

See "2. Safety considerations" on page 2.



NOTICE

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



CAUTION

Do not rinse the outdoor unit. This may cause electric shocks or fire.



DANGER: DO NOT TOUCH PIPING AND INTERNAL PARTS

See "2. Safety considerations" on page 2.

- Do not touch live parts for 10 minutes after the power supply is turned off because of high voltage risk.
- Make sure that the power supply is turned off before performing the maintenance work. The heater of the compressor may operate even in stop mode.

- Please note that some sections of the electric component box are extremely hot.
- Make sure you do not touch a conductive section.
- After measuring the residual voltage, pull out the outdoor fan connector.
- The outdoor fan may rotate due to strong backblow wind, causing the capacitor to charge. This may result in an electric shock.

After maintenance, make sure the outdoor fan connector is connected again. Otherwise, the unit may break down.

16.2. Service mode operation

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

17. DISPOSAL REQUIREMENTS

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

18. UNIT SPECIFICATIONS

NOTES

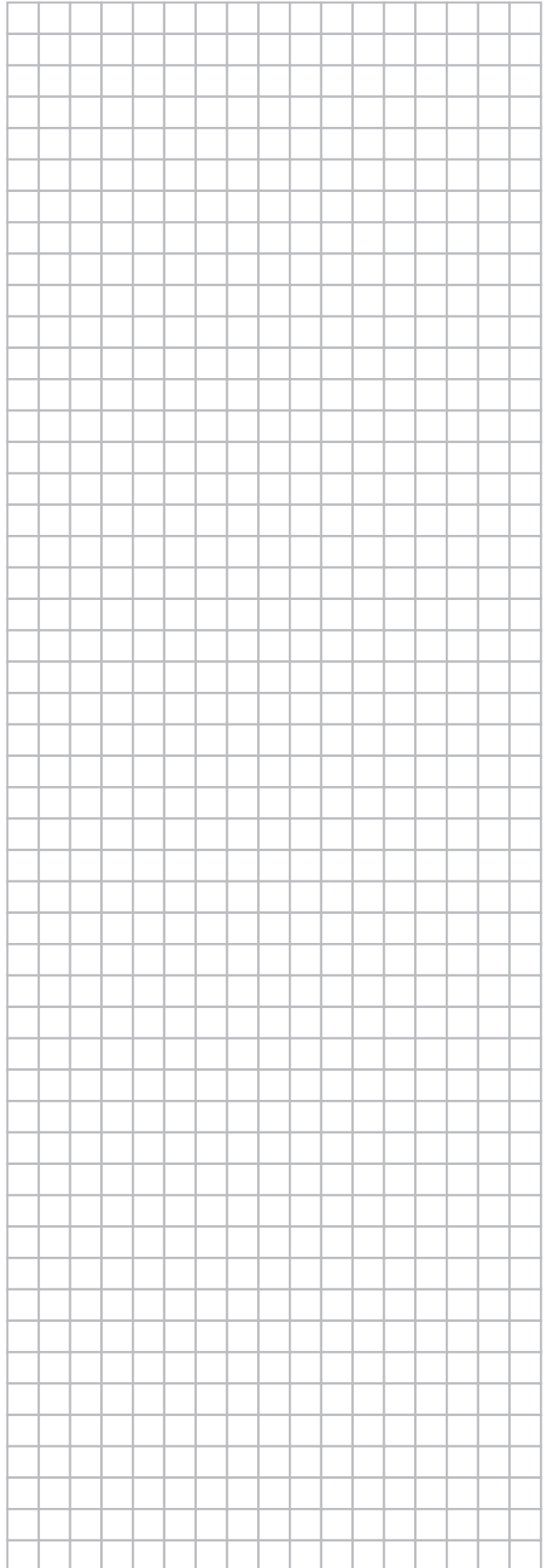
18.1. Technical specifications

	ERHQ_V3	ERHQ_W1	ERLQ_V3	ERLQ_W1
Casing material	Painted galvanised steel			
Dimensions h x w x d (mm)	1170 x 900 x 320	1345 x 900 x 320		
Weight (kg)	103	108	114	114
Operation range				
• cooling (min./max.) (°C)	10/46			
• heating (min./max.) (°C)	-20 ^(a) /35	-25 ^(a) /35		
• domestic hot water (min./max.) (°C)	-20 ^(a) /35	-25 ^(a) /35		
Refrigerant oil	Daphne FVC68D			
Piping connection				
• liquid (mm)	9.52			
• gas (mm)	15.9			








(a) See operation range data information sheet for detailed information.

18.2. Electrical specifications

	V3	W1
Phase	1~	3N~
Frequency (Hz)	50	50
Voltage range		
• minimum (V)	207	360
• maximum (V)	253	440



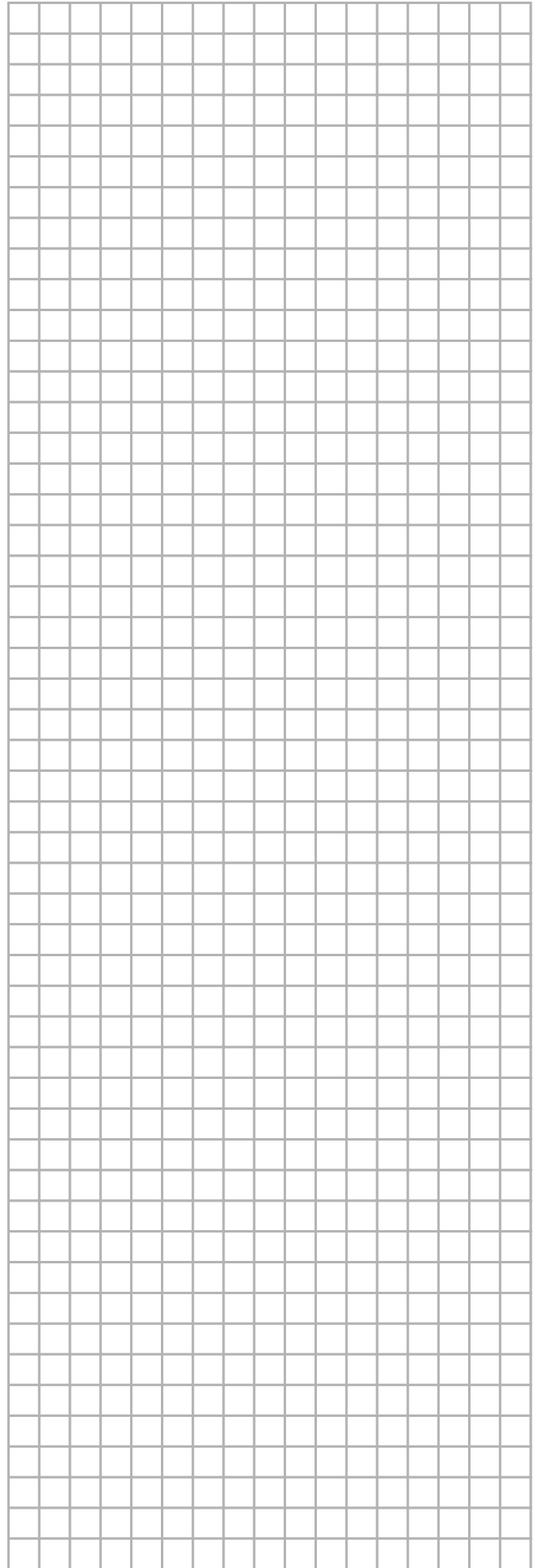
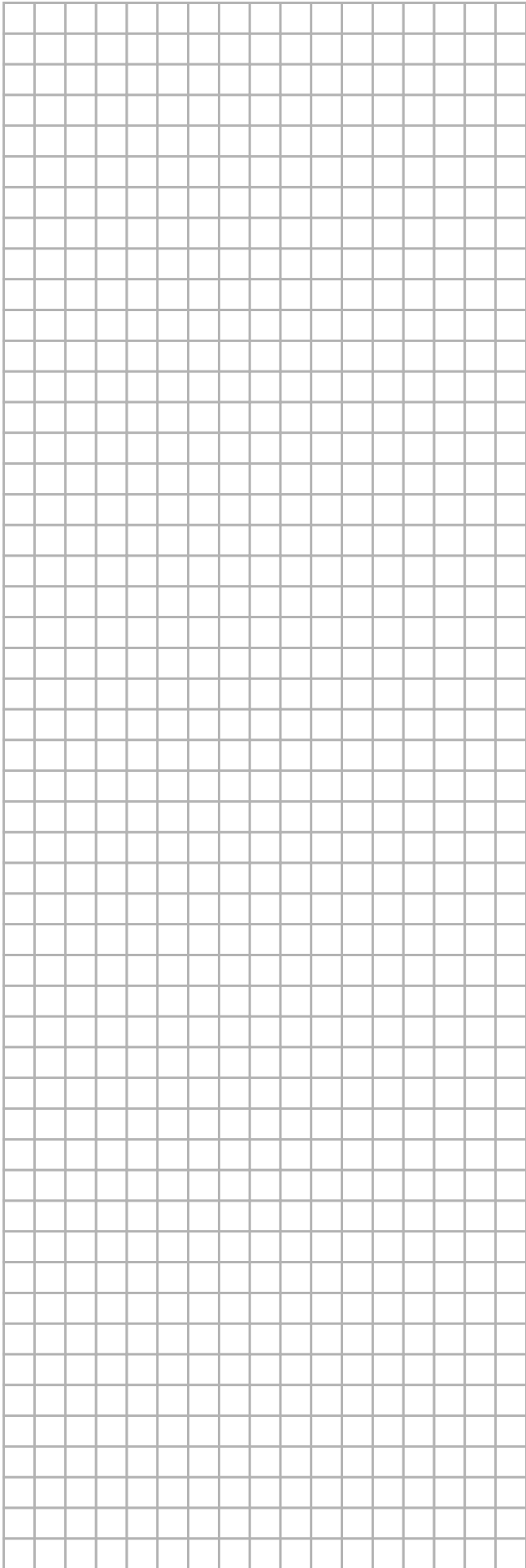
19. WIRING DIAGRAM

	: Wire clamp	L	: Live		
	: Terminal strip	N	: Neutral		
	: Connector				
	: Relay connector	BLK	: Black	ORG	: Orange
	: Field wiring	BLU	: Blue	RED	: Red
	: Protective earth screw	BRN	: Brown	WHT	: White
	: Noiseless earth	GRN	: Green	YLW	: Yellow

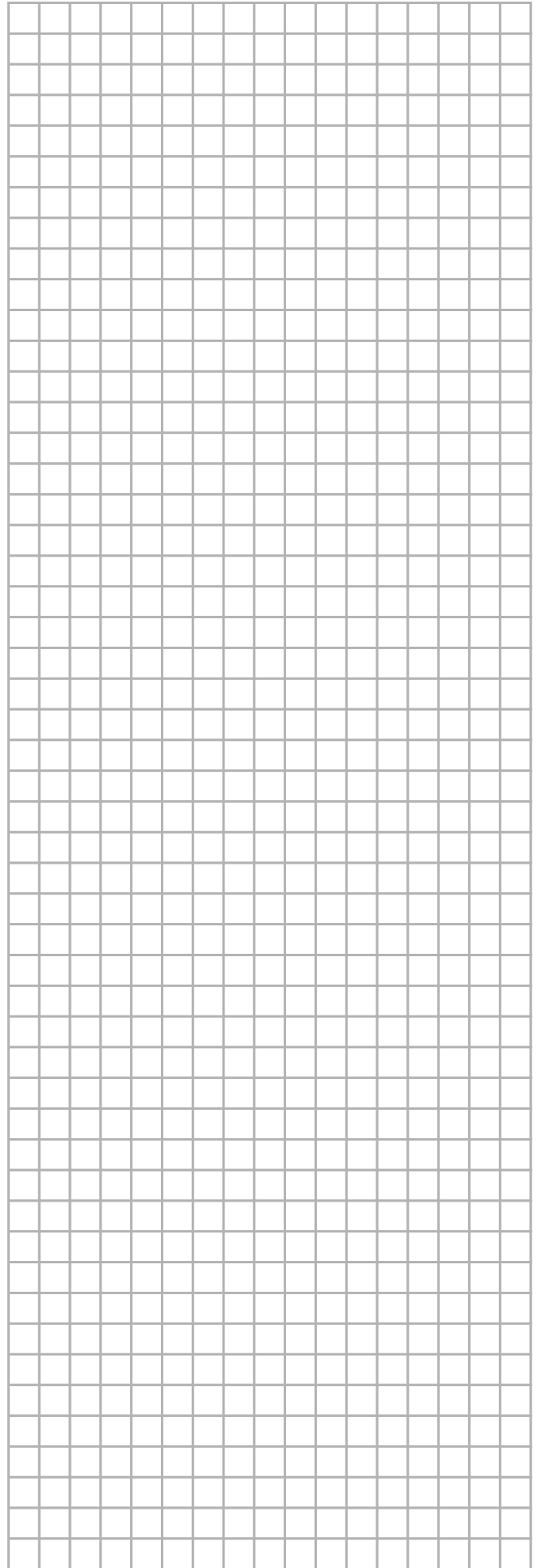
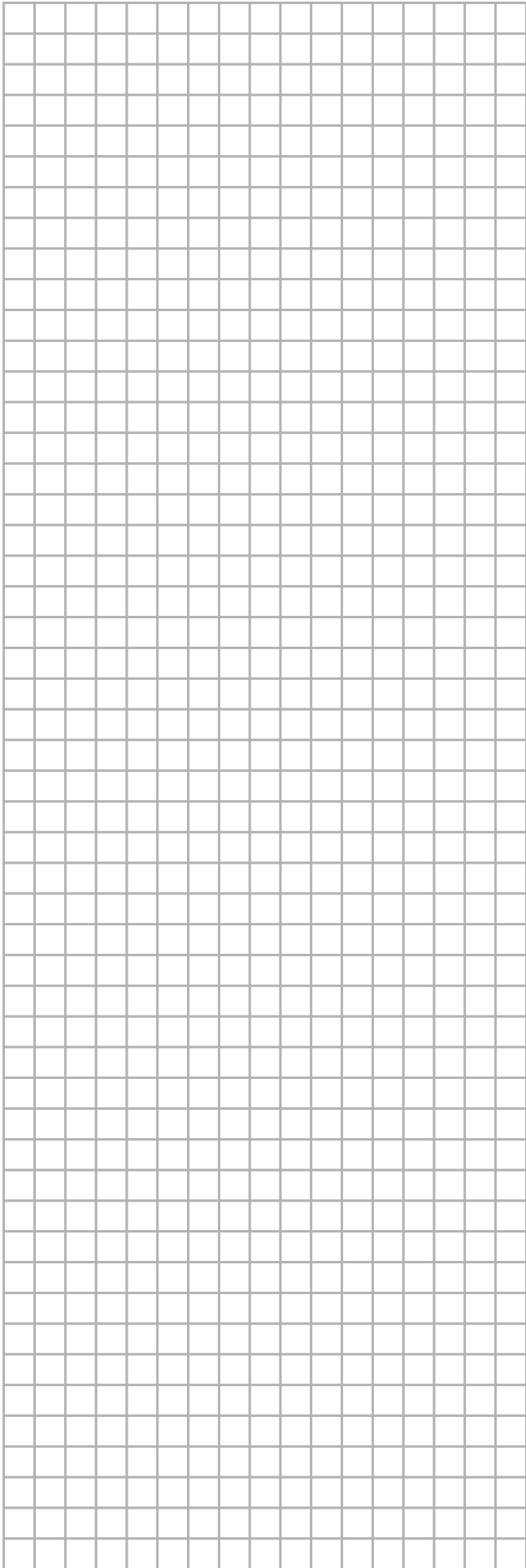
- NOTE 1 This wiring diagram only applies to the outdoor unit
- NOTE 4 Refer to the option manual for connecting wiring to X6A/X77A
- NOTE 5 Refer to the wiring diagram sticker (on back of front panel) on how to use BS1~BS4 and DS1 switch
- NOTE 6 Do not operate the unit by short-circuiting protection device S1PH
- NOTE 8 Confirm the method of setting the selector switches (DS1) by service manual. Factory setting of all switches: 'OFF'
- NOTE 9 Option: Option
Wiring depending on model: Wiring depending on model

A1P~A4PPrinted circuit board	R5T Thermistor (heat exchanger middle)
BS1~BS4Push button switch	R6T Thermistor (liquid)
C1~C4Capacitor	R7T Thermistor (fin) (for W1 models only)
DS1DIP switch	R10T Thermistor (fin) (for V3 models only)
E1HBottom plate heater	RC Signal receiver circuit (for V3 models only)
E1HCCrankcase heater	S1NPH Pressure sensor
F1U~F9UFuse	S1PH Pressure switch (high)
HAP (A1P)Service monitor (green)	TC Signal transmission circuit (for V3 models only)
HAP (A2P)Service monitor (green) (for W1 models only)	V1R Power module (for V3 models only)
H1P~H7P (A1P)Service monitor (orange) (for W1 models only)	V1R, V2R Power module (for W1 models only)
H1P~H7P (A2P)Service monitor (orange)	V2R, V3R Diode module (for V3 models only)
K1M, K2MMagnetic contactor (for W1 models only)	V3R Diode module (for W1 models only)
K1R~K4RMagnetic relay	V1T Insulated gate bipolar transistor (for V3 models only)
K10R, K11RMagnetic relay (for V3 models only)	X1M Terminal strip
L1R~L4RReactor	X1Y Connector (option, bottom plate heater ERHQ)
M1CMotor (compressor)	X6A Connector (option)
M1FMotor (fan) (upper)	X77A Connector
M2FMotor (fan) (lower)	Y1E Expansion valve (main)
PSSwitching power supply	Y3E Expansion valve (injection)(for ERLQ only)
Q1DIEarth leakage circuit breaker (field supply)	Y1S Solenoid valve (4-way valve)
R1~R4Resistor	Y3S Solenoid valve (for W1 models only, ERHQ)
R1TThermistor (air)	Y3S Solenoid valve (hot gas pass)(for ERLQ only)
R2TThermistor (discharge)	Z1C~Z9C Noise filter
R3TThermistor (suction pipe)	Z1F~Z4F Noise filter
R4TThermistor (heat exchanger)	

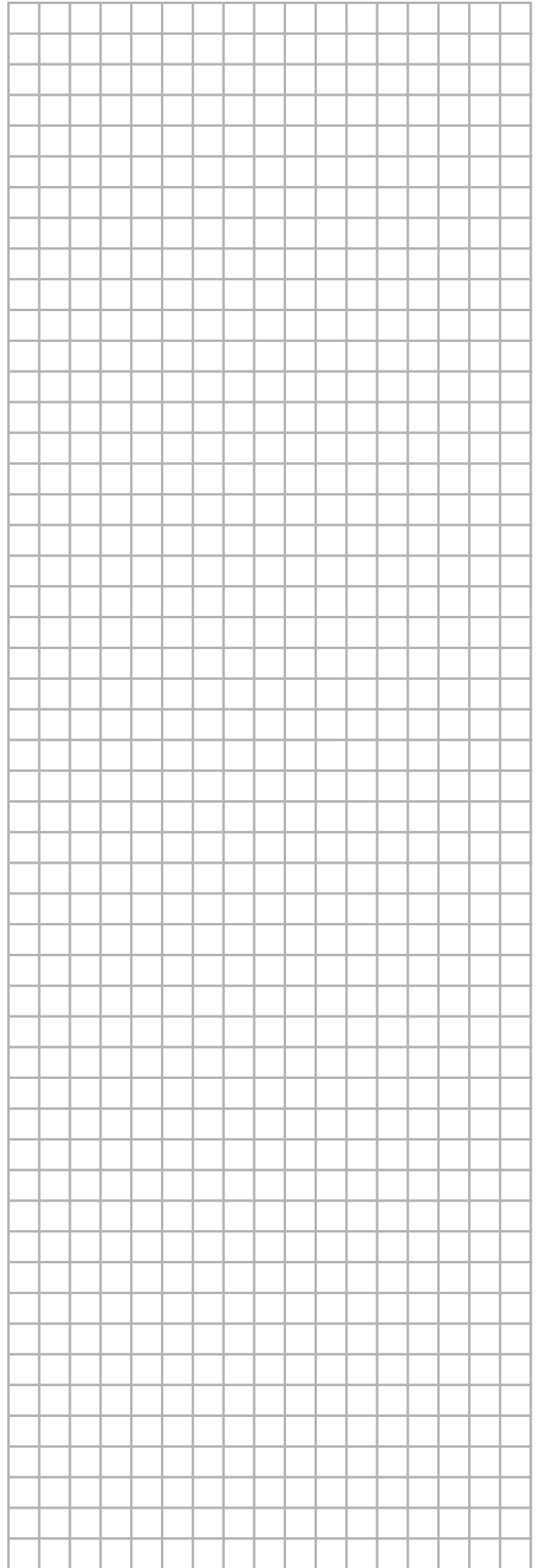
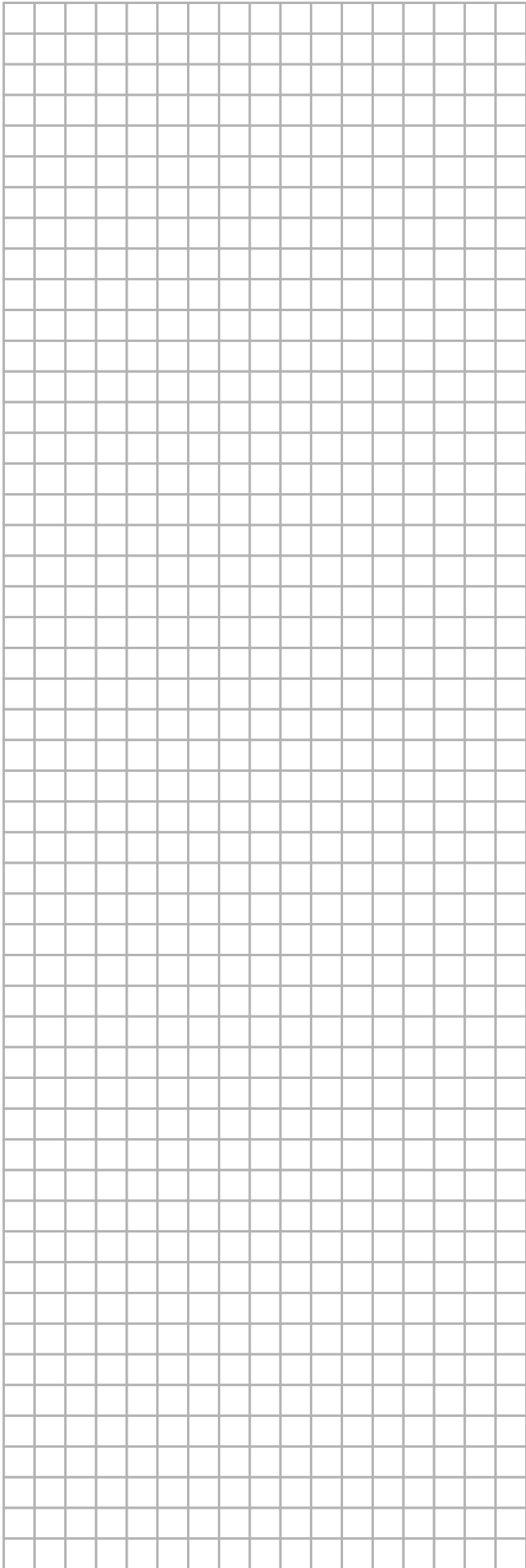
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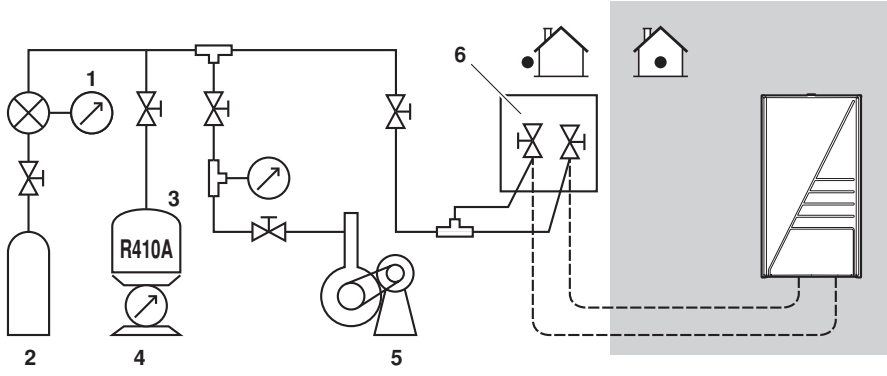


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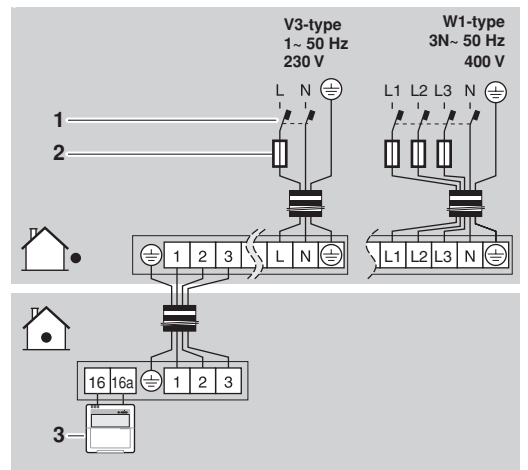


NOTES





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6

NOTES

Grid area for notes.



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