MITSUBISHI ELECTRIC

Air to Water Heat Pump
PUZ-SWM • AA series / PUZ-SHWM • AA series

INSTALLATION MANUAL
FOR INSTALLER

For safe and correct use, read this manual and the indoor unit installation manual thoroughly before installing the outdoor unit. English is original. The other languages versions are translation of the original.

English

INSTALLATIONSHANDBUCH
FÜR INSTALLATEURE

Aus Sicherheitsgründen und zur richtigen Verwendung vor der Installation der Außenanlage das vorliegende Handbuch und die Installationsanleitung der Innenanlage gründlich durchlesen. Das Original ist in Englisch. Die anderen Sprachversionen sind vom Original übersetzt.

Deutsch

MANUEL D'INSTALLATION
POUR L'INSTALLATEUR

Avant d'installer l'appareil extérieur, lire attentivement ce manuel, ainsi que le manuel d'installation de l'appareil intérieur pour une utilisation sûre et correcte. L'anglais est l'original. Les versions fournies dans d'autres langues sont des traductions de l'original.

Français

INSTALLATIEHANDLEIDING
VOOR DE INSTALLATEUR

Lees voor een veilig en juist gebruik deze handleiding en de installatiehandleiding van het binnenapparaat zorgvuldig door voordat u met het installeren van het buitenapparaat begint. Het Engels is het origineel. De andere taalversies zijn vertalingen van het origineel.

Nederlands

MANUAL DE INSTALACIÓN
PARA EL INSTALADOR

Para un uso correcto y seguro, lea detalladamente este manual y el manual de instalación de la unidad interior antes de instalar la unidad exterior. El idioma original del documento es el inglés. Las versiones en los demás idiomas son traducciones del original.

Español

MANUALE DI INSTALLAZIONE
PER L'INSTALLATORE

Per un uso sicuro e corretto, leggere attentamente il presente manuale ed il manuale d'installazione dell'unità interna prima di installare l'unità esterna. Il testo originale è redatto in lingua Inglese. Le altre versioni linguistiche rappresentano traduzioni dell'originale.

Italiano

ΕΓΧΕΙΡΙΔΙΟ ΟΔΗΓΙΩΝ ΕΓΚΑΤΑΣΤΑΣΗΣ
ΓΙΑ ΑΥΤΟΝ ΠΟΥ ΚΑΝΕΙ ΤΗΝ ΕΓΚΑΤΑΣΤΑΣΗ

Για σωστή και ασφαλή χρήση, διαβάστε προσεκτικά αυτό το εγχειρίδιο καθώς και το εγχειρίδιο εγκατάστασης της εσωτερικής μονάδας, προτού εγκαταστήσετε την εξωτερική μονάδα. Η γλώσσα του πρωτοτύπου είναι η αγγλική. Οι εκδόσεις άλλων γλωσσών είναι μεταφράσεις του πρωτοτύπου.

Ελληνικά

MANUAL DE INSTALAÇÃO
PARA O INSTALADOR

Para uma utilização segura e correcta, leia atentamente este manual e o manual de instalação da unidade interior antes de instalar a unidade exterior. O idioma original é o inglês. As versões em outros idiomas são traduções do idioma original.

Português

INSTALLATIONSMANUAL
TIL INSTALLATØREN

Læs af sikkerhedshensyn denne manual samt manualen til installation af indendørsenheden grundigt, før du installerer udendørsenheden. Engelsk er originalsproget. De andre sprogversioner er oversættelser af originalen.

Dansk

INSTALLATIONSMANUAL
FÖR INSTALLATÖREN

Läs bruksanvisningen och inomhusenhetens installationshandbok noga innan du installerar utomhusenhet för säker och korrekt användning. Engelska är originalspråket. De övriga språkversionerna är översättningar av originalet.

Svenska

INSTALLASJONSHÅNDBOK
FOR MONTØR

For å sikre trygg og riktig bruk skal denne håndboken samt installasjonshåndboken for innendørsenheten leses grundig igjennom før enheten installeres. Engelsk er originalspråket. De andre språkversjonene er oversettelser av originalen.

Norsk

ASENNUSOPAS
ASENTAJALLE

Turvallisen ja asianmukaisen käytön varmistamiseksi lue tämä opas sekä sisäyksikön asennusopas huolellisesti ennen ulkoyksikön asentamista. Alkuperäiskieli on englanti. Muut kieliversiot ovat alkuperäisen käännöksiä.

Suomi

NÁVOD K MONTÁŽI
PRO MONTÉRA

Kvůli zajištění bezpečného a správného používání si před montáží vnější jednotky pečlivě přečtěte tento návod i návod k montáži vnitřní jednotky. Verze v angličtině je originál. Ostatní jazykové verze jsou překladem originálu.

Čeština

INSTRUKCJA MONTAŻU
DLA INSTALATORA

Aby zapewnić bezpieczne i prawidłowe korzystanie z urządzenia, przed montażem jednostki zewnętrznej należy dokładnie zapoznać się z treścią niniejszej instrukcji oraz instrukcji montażu jednostki wewnętrznej. Oryginalną instrukcję sporządzono w języku angielskim. Pozostałe wersje językowe zostały przetłumaczone z oryginału.

Polski

РЪКОВОДСТВО ЗА МОНТАЖ
ЗА ИНСТАЛАТОРА

За безопасно и правилно използване, прочетете внимателно това ръководство и ръководството за монтаж на вътрешното тяло, преди да монтирате външното тяло. Версията на английски език е оригинал. Версиите на други езици са превод от оригинала.

Български

NÁVOD NA INŠTALÁCIU
PRE MONTÉRA

V záujme bezpečného a správneho používania si pred inštaláciou exteriérovej jednotky prečítajte tento návod a návod na inštaláciu interiérovej jednotky. Preklad anglického originálu. Všetky jazykové verzie sú preložené z angličtiny.

Slovenčina

TELEPÍTÉSI KÉZIKÖNYV
A TELEPÍTŐ RÉSZÉRE

A biztonságos és helyes használat érdekében a kültéri egység felszerelése előtt olvassa el figyelmesen ezt a használati utasítást és a beltéri egység telepítési kézikönyvét. Az angol változat az eredeti. A többi nyelvi változat az eredeti fordítása.

Magyar

PRIROČNIK ZA NAMESTITEV
ZA MONTERJA

Za varno in pravilno uporabo natančno preberite ta navodila za uporabo in namestitveni priročnik za notranjo enoto, preden namestite zunanjo enoto. Izvirnik je v angleščini. Druge jezikovne različice so prevodi izvirnika.

Slovenščina

MANUAL CU INSTRUCŢIUNI DE INSTALARE
PENTRU INSTALATOR

Pentru a utiliza aparatul corect şi în siguranţă, citiţi în întregime aceste instrucţiuni şi manualul de instalare al unităţii interioare înainte de a instala unitatea exterioară. Textul original este în limba engleză. Versiunile pentru celelalte limbi sunt traduceri ale originalului.

Română

PAIGALDUSJUHEND
PAIGALDAJALE

Ohutu ja õige kasutuse tagamiseks lugege see juhend ja siseruumides kasutatava seadme paigaldusjuhend enne välisseadme paigaldamist põhjalikult läbi. Originaaljuhend on ingliskeelne. Muudes keeltes versioonid on originaali tõlked.

Eesti

MONTĀŽAS ROKASGRĀMATA
UZSTĀDĪŠANAS SPECIĀLISTAM

Lai nodrošinātu pareizu un drošu iekārtas lietošanu, pirms ārējās iekārtas uzstādīšanas rūpīgi izlasiet šo rokasgrāmatu un iekšējās iekārtas montāžas rokasgrāmatu. Oriģināls ir angļu valodā. Versijas citās valodās ir oriģināla tulkojums.

Latviski

MONTAVIMO VADOVAS
SKIRTA MONTUOTOJUI

Prieš montuodami išorinį įrenginį, saugiam ir tinkamam naudojimui užtikrinti atidžiai perskaitykite šį vadovą ir vidinio įrenginio montavimo vadovą. Originalas yra anglų k. Versijos kitomis kalbomis yra originalo vertimas.

Lietuviškai

PRIRUČNIK ZA UGRADNJU
ZA INSTALATERA

Radi sigurne i pravilne uporabe pročitajte pažljivo ovaj priručnik i priručnik za postavljanje unutarnje jedinice prije postavljanja vanjske jedinice. Tekst je izvorno napisan na engleskom jeziku. Tekst na ostalim jezicima predstavlja prijevod izvorno napisanog teksta.

Hrvatski

UPUTSTVO ZA UGRADNJU
ZA MONTERA

Radi bezbedne i ispravne upotrebe, detaljno pročitajte ovo uputstvo i uputstvo za ugradnju unutrašnje jedinice pre nego što ugradite spoljnu jedinicu. Prevod originala. Verzije na drugim jezicima su prevodi originala.

Srpski

Manual Download

http://www.mitsubishielectric.com/ldg/ibim/

en Go to the above website to download manuals, select model name, then choose language.

de Besuchen Sie die oben stehende Website, um Anleitungen herunterzuladen, wählen Sie den Modellnamen und dann die Sprache aus.

fr Rendez-vous sur le site Web ci-dessus pour télécharger les manuels, sélectionnez le nom de modèle puis choisissez la langue.

nl Ga naar de bovenstaande website om handleidingen te downloaden, de modelnaam te selecteren en vervolgens de taal te kiezen.

es Visite el sitio web anterior para descargar manuales, seleccione el nombre del modelo y luego elija el idioma.

it Andare sul sito web indicato sopra per scaricare i manuali, selezionare il nome del modello e scegliere la lingua.

el Μεταβείτε στον παραπάνω ιστότοπο για να κατεβάσετε εγχειρίδια. Επιλέξτε το όνομα του μοντέλου και, στη συνέχεια, τη γλώσσα.

pt Aceda ao site Web acima indicado para descarregar manuais, seleccione o nome do modelo e, em seguida, escolha o idioma.

da Gå til ovenstående websted for at downloade manualer og vælge modelnavn, og vælg derefter sprog.

sv Gå till ovanstående webbplats för att ladda ner anvisningar, välj modellnamn och välj sedan språk.

no Gå til nettstedet over for å laste ned håndbøker og velg modellnavn, og velg deretter språk.

fi Mene yllä mainitulle verkkosivulle ladataksesi oppaat, valitse mallin nimi ja valitse sitten kieli.

cs Příručky naleznete ke stažení na internetové stránce zmíněné výše poté, co zvolíte model a jazyk.

pl Odwiedź powyższą stronę internetową, aby pobrać instrukcje, wybierz nazwę modelu, a następnie język.

bg Посетете горепосочения уебсайт, за да изтеглите ръководства, като изберете име на модел и след това – език.

sk Na webovej stránke vyššie si môžete stiahnuť návody. Vyberte názov modelu a zvoľte požadovaný jazyk.

hu A kézikönyvek letöltéséhez látogasson el a fenti weboldalra, válassza ki a modell nevét, majd válasszon nyelvet.

sl Obiščite zgornjo spletno stran za prenos priročnikov; izberite ime modela, nato izberite jezik.

ro Accesaţi site-ul web de mai sus pentru a descărca manualele, selectaţi denumirea modelului, apoi alegeţi limba.

et Kasutusjuhendite allalaadimiseks minge ülaltoodud veebilehele, valige mudeli nimi ja seejärel keel.

lv Dodieties uz iepriekš norādīto tīmekļa vietni, lai lejupielādētu rokasgrāmatas; tad izvēlieties modeļa nosaukumu un valodu.

lt Norėdami atsisiųsti vadovus, apsilankykite pirmiau nurodytoje žiniatinklio svetainėje, pasirinkite modelio pavadinimą, tada – kalbą.

hr Kako biste preuzeli priručnike, idite na gore navedeno web-mjesto, odaberite naziv modela, a potom odaberite jezik.

sr Idite na gore navedenu veb stranicu da biste preuzeli uputstva, izaberite ime modela, a zatim izaberite jezik.

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Note: This symbol mark is for EU countries only.
This symbol mark is according to the directive 2012/19/EU Article 14 Information for users and Annex IX.
Your MITSUBISHI ELECTRIC product is designed and manufactured with high quality materials and components which can be recycled and reused.
This symbol means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from your household waste.
Please, dispose of this equipment at your local community waste collection/recycling centre.
In the European Union there are separate collection systems for used electrical and electronic product.
Please, help us to conserve the environment we live in!

en

⚠ CAUTION:

- **Do not vent R32 into the Atmosphere:**

1. Safety precautions

►Before installing the unit, make sure you read all the "Safety precautions".
►Please report to or take consent by the supply authority before connection to the system.
►Equipment complying with IEC/EN 61000-3-12 (PUZ-SWM·VAA/PUZ-SHWM·VAA)

⚠ WARNING:

Describes precautions that must be observed to prevent danger of injury or death to the user.

⚠ CAUTION:

Describes precautions that must be observed to prevent damage to the unit.

After installation work has been completed, explain the "Safety Precautions," use, and maintenance of the unit to the customer according to the information in the Operation Manual and perform the test run to ensure normal operation. Both the Installation Manual and Operation Manual must be given to the user for keeping. These manuals must be passed on to subsequent users.

⏚ : Indicates a part which must be grounded.

⚠ WARNING:

Carefully read the labels affixed to the main unit.
◎ : Indicates warnings and cautions when using R32 refrigerant.

MEANINGS OF SYMBOLS DISPLAYED ON THE UNIT

	**WARNING** (Risk of fire)	This mark is for R32 refrigerant only. Refrigerant type is written on nameplate of outdoor unit. In case that refrigerant type is R32, this unit uses a flammable refrigerant. If refrigerant leaks and comes in contact with fire or heating part, it will create harmful gas and there is risk of fire.
	Read the OPERATION MANUAL carefully before operation.	
	Service personnel are required to carefully read the OPERATION MANUAL and INSTALLATION MANUAL before operation.	
	Further information is available in the OPERATION MANUAL, INSTALLATION MANUAL, and the like.	

⚠ WARNING:

- **The unit must not be installed by the user. Ask a dealer or an authorized technician to install the unit. If the unit is installed incorrectly, water leakage, electric shock, or fire may result.**
- **For installation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with R32 refrigerant. The R32 refrigerant in the HFC system is pressurized 1.6 times the pressure of usual refrigerants. If pipe components not designed for R32 refrigerant are used and the unit is not installed correctly, the pipes may burst and cause damage or injuries. In addition, water leakage, electric shock, or fire may result.**
- **When installing the unit, use appropriate protective equipment and tools for safety. Failure to do so could cause injuries.**
- **The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.**
- **The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.**

en

- If the outdoor unit is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Consult a dealer regarding the appropriate measures to prevent the allowable concentration from being exceeded. Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.
- Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.
- All electric work must be performed by a qualified technician according to local regulations and the instructions given in this manual. The units must be powered by dedicated power lines and the correct voltage and circuit breakers must be used. Power lines with insufficient capacity or incorrect electrical work may result in electric shock or fire.
- 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.
- Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. If the pipes are not connected correctly, the unit will not be properly grounded and electric shock may result.
- Use only specified cables for wiring. The wiring connections must be made securely with no tension applied on the terminal connections. Also, never splice the cables for wiring (unless otherwise indicated in this document).
  Failure to observe these instructions may result in overheating or a fire.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid hazard.
- The appliance shall be installed in accordance with national wiring regulations.
- The terminal block cover panel of the outdoor unit must be firmly attached. If the cover panel is mounted incorrectly and dust and moisture enter the unit, electric shock or fire may result.
- When installing or relocating, or servicing the outdoor unit, use only the specified refrigerant (R32) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines.
  If air is mixed with the refrigerant, then it can be the cause of abnormal high pressure in the refrigerant line, and may result in an explosion and other hazards.
  The use of any refrigerant other than that specified for the system will cause mechanical failure or system malfunction or unit breakdown. In the worst case, this could lead to a serious impediment to securing product safety.
- Use only accessories authorized by Mitsubishi Electric and ask a dealer or an authorized technician to install them. If accessories are incorrectly installed, water leakage, electric shock, or fire may result.
- Do not alter the unit. Consult a dealer for repairs. If alterations or repairs are not performed correctly, water leakage, electric shock, or fire may result.
- The user should never attempt to repair the unit or transfer it to another location. If the unit is installed incorrectly, water leakage, electric shock, or fire may result. If the outdoor unit must be repaired or moved, ask a dealer or an authorized technician.
- After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.
- When opening or closing the valve below freezing temperatures, refrigerant may spurt out from the gap between the valve stem and the valve body, resulting in injuries.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.

◎ Pipe-work shall be protected from physical damage.

- The installation of pipe-work shall be kept to a minimum.
- Compliance with national gas regulations shall be observed.
- Keep any required ventilation openings clear of obstruction.

◎ Do not use low temperature solder alloy in case of brazing the refrigerant pipes.

◎ When performing brazing work, be sure to ventilate the room sufficiently.
  Make sure that there are no hazardous or flammable materials nearby.
  When performing the work in a closed room, small room, or similar location, make sure that there are no refrigerant leaks before performing the work.
  If refrigerant leaks and accumulates, it may ignite or poisonous gases may be released.

◎ The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.

◎ Keep gas-burning appliances, electric heaters, and other fire sources (ignition sources) away from the location where installation, repair, and other outdoor unit work will be performed.
  If refrigerant comes into contact with a flame, poisonous gases will be released.

◎ Do not smoke during work and transportation.

1. Safety precautions

1.1. Before installation

⚠ CAUTION:

- **Do not use the unit in an unusual environment. If the outdoor unit is installed in areas exposed to steam, volatile oil (including machine oil), or sulfuric gas, areas exposed to high salt content such as the seaside, or areas where the unit will be covered by snow, the performance can be significantly reduced and the internal parts can be damaged.**
- **Do not install the unit where combustible gases may leak, be produced, flow, or accumulate. If combustible gas accumulates around the unit, fire or explosion may result.**
- **The outdoor unit produces condensation during the heating operation. Make sure to provide drainage around the outdoor unit if such condensation is likely to cause damage.**
- **Remove the compressor's fixing component in accordance with the NOTICE attached to the unit. Running the unit with the fixing component mounted will result in increased noise.**
- **When installing the unit in a hospital or communications office, be prepared for noise and electronic interference. Inverters, home appliances, high-frequency medical equipment, and radio communications equipment can cause the outdoor unit to malfunction or breakdown. The outdoor unit may also affect medical equipment, disturbing medical care, and communications equipment, harming the screen display quality.**
- **When the unit is running, vibrations or the noise of refrigerant running may be heard from the extension piping. Try to avoid installing the piping to thin walls, etc. as much as possible and provide sound insulation with the piping cover, etc.**

1.2. Before installation (relocation)

⚠ CAUTION:

- **Be extremely careful when transporting or installing the units. Two or more persons are needed to handle the unit, as it weighs 20 kg or more. Do not grasp the packaging bands. Wear protective gloves to remove the unit from the packaging and to move it, as you can injure your hands on the fins or the edge of other parts.**
- **Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause stabs or other injuries.**
- **The base and attachments of the outdoor unit must be periodically checked for looseness, cracks or other damage. If such defects are left uncorrected, the unit may fall down and cause damage or injuries.**
- **Do not clean the outdoor unit with water. Electric shock may result.**
- **Tighten all flare nuts to specification using a torque wrench. If tightened too much, the flare nut can break after an extended period and refrigerant can leak out.**

1.3. Before electric work

⚠ CAUTION:

- **Be sure to install circuit breakers. If not installed, electric shock may result.**
- **For the power lines, use standard cables of sufficient capacity. Otherwise, a short circuit, overheating, or fire may result.**
- **When installing the power lines, do not apply tension to the cables. If the connections are loosened, the cables can snap or break and overheating or fire may result.**
- **Be sure to ground the unit. Do not connect the ground wire to gas or water pipes, lightning rods, or telephone grounding lines. If the unit is not properly grounded, electric shock may result.**
- **Use circuit breakers (ground fault interrupter, isolating switch (+B fuse), and molded case circuit breaker) with the specified capacity. If the circuit breaker capacity is larger than the specified capacity, breakdown or fire may result.**

1.4. Before starting the test run

⚠ CAUTION:

- **Turn on the main power switch more than 12 hours before starting operation. Starting operation just after turning on the power switch can severely damage the internal parts. Keep the main power switch turned on during the operation season.**
- **Before starting operation, check that all panels, guards and other protective parts are correctly installed. Rotating, hot, or high voltage parts can cause injuries.**
- **Do not touch any switch with wet hands. Electric shock may result.**
- **Do not touch the refrigerant pipes with bare hands during operation. The refrigerant pipes are hot or cold depending on the condition of the flowing refrigerant. If you touch the pipes, burns or frostbite may result.**
- **After stopping operation, be sure to wait at least five minutes before turning off the main power switch. Otherwise, water leakage or breakdown may result.**

1.5. Using R32 refrigerant outdoor units

⚠ CAUTION:

- **Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust. Use pipes with the specified thickness. (Refer to 4.1.) Note the following if reusing existing pipes that carried R22 refrigerant.**
  - Replace the existing flare nuts and flare the flared sections again.
  - Do not use thin pipes. (Refer to 4.1.)
- **Store the pipes to be used during installation indoors and keep both ends of the pipes sealed until just before brazing. (Leave elbow joints, etc. in their packaging.) If dust, debris, or moisture enters the refrigerant lines, oil deterioration or compressor breakdown may result.**
- **Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections. If mineral oil is mixed in the refrigeration oil, oil deterioration may result.**
- **Servicing shall be performed only as recommended by the manufacturer.**
- **Do not use refrigerant other than R32 refrigerant. If another refrigerant is used, the chlorine will cause the oil to deteriorate.**
- **Use the following tools specifically designed for use with R32 refrigerant. The following tools are necessary to use R32 refrigerant. Contact your nearest dealer for any questions.**

Tools (for R32)	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adapter
Torque wrench	Electronic refrigerant charging scale

- **Be sure to use the correct tools. If dust, debris, or moisture enters the refrigerant lines, refrigeration oil deterioration may result.**
- **Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.**

Continued to next page.

- **Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the refrigerating systems, ① to ⑤ shall be completed prior to conducting work on the systems.**
  ① All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out.
  Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.
  ② The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.
  ③ If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.
  Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
  ④ No person carrying out work in relation to a refrigeration system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.
  ⑤ Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.
- **Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance.**
  The following checks shall be applied to installations using flammable refrigerants:
  - The charge size is in accordance with the room size within which the refrigerant containing parts are installed.
  - The ventilation machinery and outlets are operating adequately and are not obstructed.
  - Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
  - Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being corroded.
- **Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.**
  Initial safety checks shall include that:
  - capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
  - no live electrical components and wiring are exposed while charging, recovering or purging the system;
  - there is continuity of earth bonding.
- **During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.**

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- **Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.**
  Ensure that the apparatus is mounted securely.
  Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres.
  Replacement parts shall be in accordance with the manufacturer's specifications.
- **Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.**
  Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.
  Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.
- **Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or pumps.**
- **Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks.**
  A halide torch (or any other detector using a naked flame) shall not be used.
- **Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)**
  Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25% maximum) is confirmed.
  Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipework.
  If a leak is suspected, all naked flames shall be removed/extinguished.
  If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
  For appliances containing flammable refrigerants, oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.

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- **When breaking into the refrigerant circuit to make repairs – or for any other purpose conventional procedures shall be used. However, for flammable refrigerants it is important that best practice is followed since flammability is a consideration. The following procedure shall be adhered to:**
  - remove refrigerant
  - purge the circuit with inert gas
  - evacuate
  - purge again with inert gas
  - open the circuit by cutting or brazing.

  The refrigerant charge shall be recovered into the correct recovery cylinders. For appliances containing flammable refrigerants, the system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times.

  Compressed air or oxygen shall not be used for purging refrigerant systems.

  For appliances containing flammable refrigerants, flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.

  Ensure that the outlet for the vacuum pump is not close to any ignition sources and that ventilation is available.
- **In addition to conventional charging procedures, the following requirements shall be followed:**
  - Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
  - Cylinders shall be kept upright.
  - Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
  - Label the system when charging is complete (if not already).
  - Extreme care shall be taken not to overfill the refrigeration system.

  Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leaktested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.
- **Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.**

  a) Become familiar with the equipment and its operation.
  b) Isolate system electrically.
  c) Before attempting the procedure, ensure that:
  - mechanical handling equipment is available, if required, for handling refrigerant cylinders;
  - all personal protective equipment is available and being used correctly;
  - the recovery process is supervised at all times by a competent person;
  - recovery equipment and cylinders conform to the appropriate standards.

  d) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
  e) Make sure that cylinder is situated on the scales before recovery takes place.
  f) Start the recovery machine and operate in accordance with manufacturer's instructions.
  g) Do not overfill cylinders. (No more than 80 % volume liquid charge).
  h) Do not exceed the maximum working pressure of the cylinder, even temporarily.
  i) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
  j) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and check.

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- **Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.**
- **When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.**
  The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
  The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders. If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

2. Installation location

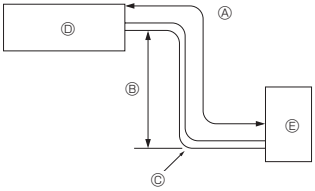


Fig. 2-1

2.1. Refrigerant pipe (Fig. 2-1)

► **Check that the difference between the heights of the indoor and outdoor units, the length of refrigerant pipe, and the number of bends in the pipe are within the limits shown below.**

Model	Ⓐ Pipe length (one way)	Ⓑ Height difference	Ⓒ Number of bends (one way)
S(H)WM60/80/100	2 m - 50 m	Max. 30 m	Max. 10
S(H)WM120/140	2 m - 30 m *1	Max. 30 m	Max. 10

*1 Only when the unit operates in heating, the pipe length available to use is 2 m - 50 m. Refer to section 4.

- Height difference limitation is defined regardless of which unit, indoor or outdoor, is positioned higher.
  Ⓓ Indoor unit
  Ⓔ Outdoor unit

The insulation materials should be satisfied the following SPECs.
- Heat transfer rate: 0.040 W/mK or less
- Insulation thickness: 9 mm or more
- Heat resistance: 110°C or more

If the piping length in the outside is over 15 m, the insulation thickness should be 18 mm or more.

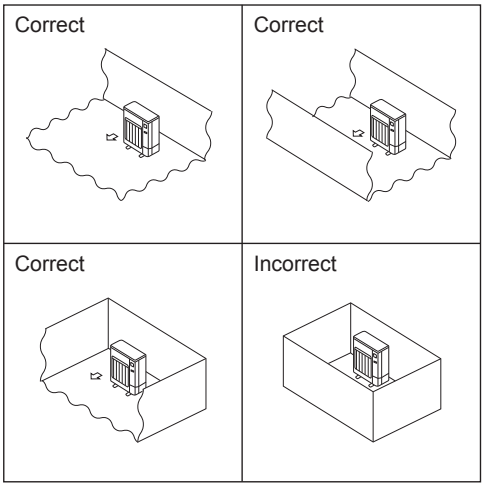


Fig. 2-2

2.2. Choosing the outdoor unit installation location

◎ R32 is heavier than air—as well as other refrigerants—so tends to accumulate at the base (in the vicinity of the floor). If R32 accumulates around base, it may reach a flammable concentration in case room is small. To avoid ignition, maintaining a safe work environment is required by ensuring appropriate ventilation. If a refrigerant leak is confirmed in a room or an area where there is insufficient ventilation, refrain from using of flames until the work environment can be improved by ensuring appropriate ventilation.
- Avoid locations exposed to direct sunlight or other sources of heat.
- Select a location from which noise emitted by the unit will not inconvenience neighbors.
- Select a location permitting easy wiring and pipe access to the power source and indoor unit.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that water may drain from the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered by snow. In areas where heavy snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
- Avoid locations exposed to oil, steam, or sulfuric gas.
- Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, hands or fingers may be pinched.
- Refrigerant pipes connection shall be accessible for maintenance purposes.

◎ Install outdoor units in a place where at least one of the four sides is open, and in a sufficiently large space without depressions. (Fig. 2-2)

⚠ CAUTION:

- **Perform grounding.**
  Do not connect the ground wire to a gas pipe, water pipe arrester or telephone ground wire. Defective grounding could cause an electric shock.
- **Do not install the unit in a place where an inflammable gas leaks.**
  If gas leaks and accumulates in the area surrounding the unit, it could cause an explosion.
- **Install a ground leakage breaker depending on the installation place (where it is humid).**
  If a ground leakage breaker is not installed, it could cause an electric shock.
- **Perform the drainage/piping work securely according to the installation manual.**
  If there is a defect in the drainage/piping work, water could drop from the unit and household goods could be wet and damaged.
- **Fasten a flare nut with a torque wrench as specified in this manual.**
  When fastened too tight, a flare nut may be broken after a long period and cause a leakage of refrigerant.

2. Installation location

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(mm)

2.3. Outline dimensions (Outdoor unit) (Fig. 2-3)

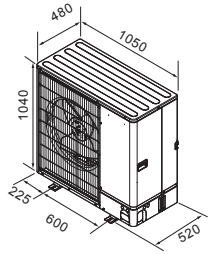


Fig. 2-3

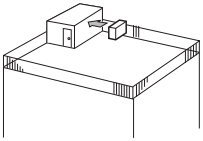


Fig. 2-4

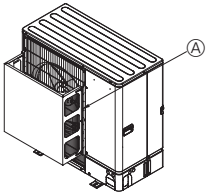


Fig. 2-5

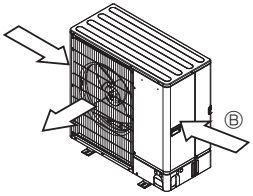


Fig. 2-6

2.4. Ventilation and service space

2.4.1. Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds. Strong wind entering the air outlet may impede the normal airflow and a malfunction may result.

The following shows three examples of precautions against strong winds.

① Face the air outlet towards the nearest available wall about 35 cm away from the wall. (Fig. 2-4)

② Install an optional air guide if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 2-5)

Ⓐ Air outlet guide

③ Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 2-6)

Ⓑ Wind direction

2.4.2. When installing a single outdoor unit (Refer to the last page)

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.

Refer to the figures for each case.

① Obstacles at rear only (Fig. 2-7)

② Obstacles at rear and above only (Fig. 2-8)

- Do not install the optional air outlet guides for upward airflow.

③ Obstacles at rear and sides only (Fig. 2-9)

④ Obstacles at front only (Fig. 2-10)

⑤ Obstacles at front and rear only (Fig. 2-11)

⑥ Obstacles at rear, sides, and above only (Fig. 2-12)

- Do not install the optional air outlet guides for upward airflow.

2.4.3. When installing multiple outdoor units (Refer to the last page)

Leave 50 mm space or more between the units.

Refer to the figures for each case.

① Obstacles at rear only (Fig. 2-13)

② Obstacles at rear and above only (Fig. 2-14)

- No more than 3 units must be installed side by side. In addition, leave space as shown.
- Do not install the optional air outlet guides for upward airflow.

③ Obstacles at front only (Fig. 2-15)

④ Obstacles at front and rear only (Fig. 2-16)

⑤ Single parallel unit arrangement (Fig. 2-17)

* When using an optional air outlet guide installed for upward airflow, the clearance is 500 mm or more.

⑥ Multiple parallel unit arrangement (Fig. 2-18)

* When using an optional air outlet guide installed for upward airflow, the clearance is 1000 mm or more.

⑦ Stacked unit arrangement (Fig. 2-19)

- The units can be stacked up to two units high.
- No more than 2 stacked units must be installed side by side. In addition, leave space as shown.