DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK

CITY OF PORTLAND

BUILDING PERMIT

This is to certify that ANNA NIEGOWSKA **Located At** 28 MAJORS CT

Job ID: 2012-05-4020-HVAC **CBL:** 153- A-025-029

has permission to Fujitsu (electric AC/heating)

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.	A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

Fire Prevention Officer **Code Enforcement Officer / Plan Reviewer**

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
PENALTY FOR REMOVING THIS CARD

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.

Job ID: 2012-05-4020-HVAC **Located At:** 28 MAJORS CT **CBL:** 153- A-025-029

Conditions of Approval:

Fire

Installation shall comply with City Code Chapter 10.

Fuel-fired boilers shall be protected in accordance with NFPA 101, *Life Safety Code*.

Installation shall comply with NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel–Burning Appliances*;

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*;

NFPA 54, *National Fuel Gas Code*;

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*;

NFPA 91, *Standard for Exhaust Systems for Air Conveying Vapors, Gases, Mists, and Noncombustible Particulate Solids*;

NFPA 70, *National Electrical Code*; and the manufacturer's published instructions.

Building

Separate permits are required for any electrical, plumbing, sprinkler, fire alarm HVAC systems, heating appliances, commercial hood exhaust systems and fuel tanks. Separate plans may need to be submitted for approval as a part of this process.

All penetrations through rated assemblies must be protected by an approved firestop system installed in accordance with ASTM E 814 or UL 1479, per IBC 2009 Section 713.

City of Portland, Maine - Building or Use Permit Application
389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No:	Date Applied:	CBL:	
2012-05-4020-HVAC	**5/17/2012**	**153- A-025-029**	
Location of Construction: **28 MAJORS CT**	Owner Name: **ANNA NIEGOWSKA**	Owner Address: **28 MAJORS CT PORTLAND, ME 04103**	Phone:
Business Name:	Contractor Name: **William W Gelinas, @ Gelinas HVAC Services**	Contractor Address: **2 WASHINGTON AVE SCARBOROUGH MAINE 04074**	Phone: **(207) 885-0771**
Lessee/Buyer's Name:	Phone:	Permit Type: **HVAC**	Zone: **R-5 PRUD**
Past Use: **33 Residential Condos**	Proposed Use: **Same: 33 Residential Condos of which this is one condo – to install new Fujitsu heating system**	Cost of Work: **$9000.00**	CEO District:
		Fire Dept: ___ Approved w/ conditions ___ Denied ___ N/A Signature: Capt. Rivard	Inspection: Use Group: U Type: HVAC Signature:
Proposed Project Description: **Fujitsu (electric AC/heating)**		Pedestrian Activities District (P.A.D.)	
Permit Taken By: Brad		**Zoning Approval**	

Special Zone or Reviews	Zoning Appeal	Historic Preservation
___ Shoreland	___ Variance	✓ Not in Dist or Landmark
___ Wetlands	___ Miscellaneous	___ Does not Require Review
___ Flood Zone	___ Conditional Use	___ Requires Review
___ Subdivision	___ Interpretation	___ Approved
___ Site Plan	___ Approved	___ Approved w/Conditions
___ Maj ___ Min ___ MM	___ Denied	___ Denied
Date: 5/17/12	Date:	Date:

1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.
2. Building Permits do not include plumbing, septic or electrial work.
3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.

CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT ADDRESS DATE PHONE

RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE DATE PHONE

FILL IN AND SIGN WITH INK

Extend 5/17/12 (BS)

APPLICATION FOR PERMIT
HEATING OR POWER EQUIPMENT

2012-05-4020-HVAC R-5 PKUD

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL 153 A025 — 33 Residential Condos — Use of Building Residential — Date 5/17/12

Name and address of owner of appliance Anna Niegowska

28 Majors Court Portland, Me. 04

Installer's name and address Gelinas HVAC Services INC

2 Washington Ave Scarborough, Me. 04074 — Telephone (207) 885-0771

Location of appliance:

- ☐ Basement
- ☐ Floor
- ☑ Attic
- ☐ Roof

Type of Fuel:

- ☐ Gas
- ☐ Oil
- ☐ Solid
- ☑ Elec

Appliance Name: Fujitsu — Electric

U.L. Approved ☑ Yes ☐ No

Will appliance be installed in accordance with the manufacturer's installation instructions? ☑ Yes ☐ No

RECEIVED MAY 17 2012 Dept. of Building Inspections City of Portland Maine

IF NO Explain:

The Type of License of Installer:

- ☐ Master Plumber #
- ☐ Solid Fuel #
- ☐ Oil #
- ☐ Gas #
- ☑ Other Refrigerant: Type I & II

ID 059205417

Type of Chimney:

- ☐ Masonry Lined
  Factory built N/A
- ☐ Metal
  Factory Built U.L. Listing # N/A
- ☐ Direct Vent
  Type N/A UL# N/A

Type of Fuel Tank

- ☐ Oil N/A
- ☐ Gas

Size of Tank N/A

Number of Tanks N/A

Distance from Tank to Center of Flame N/A **feet.**

Cost of Work: $ 8,300 — 9000

Permit Fee: $ 110.00

Approved

Fire:

Ele.:

Bldg.:

Approved with Conditions

☐ See attached letter or requirement

Inspector's Signature — Date Approved

Signature of Installer William N. Gelinas

White - Inspection Yellow - File Pink - Applicant's Gold - Assessor's Copy

PORTLAND MAINE

Strengthening a Remarkable City, Building a Community for Life • *www.portlandmaine.gov*

Receipts Details:

Tender Information: Check , Check Number: 19800
Tender Amount: 110.00

Receipt Header:

Cashier Id: bsaucier
Receipt Date: 5/17/2012
Receipt Number: 44044

Receipt Details:

Referance ID:	6547	Fee Type:	BP-Constr
Receipt Number:	0	Payment Date:	
Transaction Amount:	110.00	Charge Amount:	110.00
Job ID: Job ID: 2012-05-4020-HVAC - Fujitsu (electric AC/heating)			
Additional Comments: 28 Majors Ct.			

Thank You for your Payment!

Gelinas HVAC Services Inc.
2 Washington ave.
Scarborough, Me. 04074
(207)885-0771

Date: April 20, 2012

To: Anna Niegowska
28 Majors court
Portland, Me.
(207)653-9901

Re: Air Conditioning/Heat pump system

Gelinas HVAC Services, Inc. is pleased to have this opportunity to offer our services to you. We appreciate your business and the confidence you have placed in us. We propose to: Install one Fujitsu Dual-Zone heat pump system. One concealed ducted unit for the two 2nd floor rooms and hall wall. The other concealed ducted unit for the open area and 1st floor master bedroom.

Furnish and Install:

1) One (1) Fujitsu m/n AOU24RLXFZ HFI 15.5 SEER outdoor heat pump unit with R410A earth friendly refrigerant. (to be located outdoors behind home on patio)
2) One (1) Fujitsu m/n ARU9RMLF 9K indoor concealed type fan coil unit. (to be located in attic serving the areas on 2nd floor)
3) One (1) Fujitsu m/n ARU18RML 18K indoor concealed type fan coil unit. (to be located above master bedroom serving the large open area and master bedroom)
4) Two (2) Refrigeration line sets.
1) Two (2) wall mounted heat/cool programmable thermostat.
2) One (1) outdoor condenser pad.
3) Each 2nd floor room to have one (1) ceiling supply register.
4) One (1) Ceiling type filtered return. *located in hallway at top of stairway.
5) Master bedroom to have one (1) ceiling type supply and open area to have wall type supply along with filtered wall return.
6) Air handlers to have safety condensate switch.
7) All communication wiring needed.
8) All additional pvc drain line needed. *to terminate out soffit
9) Start and test newly installed system.
10) Proper clean-up of work site daily.
11) Warranty; Gelinas HVAC Services Inc., shall support all manufacture parts/labor warranties. *See manufacture warranty

Note:

1) Customer responsible for all condo board approvals.

The above referenced installation shall be completed for the price of $8,300.00
Eight thousand three dollars and no cents.

Payment terms:

* 30% upfront with signed agreement 2,490.00
* 40% to be billed at completion 3,320.00
* 30% to be billed at completion 2,490.00

a. Installation to begin within five (5) weeks of receipt of the signed contract and deposit given materials are available.
b. Work to be performed Monday through Friday, 8:30 A.M – 4:30 P.M.
c. Should installation be stopped for any reason, Gelinas HVAC Services, Inc. shall be paid in full for all labor and materials provided up to point of interruption.
d. There shall be a one year warranty on labor once installation has been completed.
e. Warranty; in addition to any warranties agreed to by parties, the contractor warrants that work will be free from faulty materials, constructed according to the standards of the building code applicable for this location, constructed in a skillful manner and fit for habitation or appropriate use. The warranty rights and remedies set forth in Maine Uniform Commercial code apply to this contract.
f. If a dispute arises concerning the provisions of this contract or the performance by the parties that may not be resolved through small claims court action, then the parties agree to settle this dispute by jointly paying for one of the following: (check only one)
   1. Binding arbitration under the Maine Uniform Arbitration Act, in which the parties agree to accept as final arbitrator's decision ( )
   2. Nonbinding arbitration, with the parties free to reject the arbitrator's decision and to seek a solution through other means, including a lawsuit. ( )
   3. Mediation, in which the parties negotiate through a neutral mediator in an effort to resolve their differences in advance of filing a lawsuit. ( )

g. Any alteration or deviation from the above contractual specifications that results in a revision of the contract price will be executed only upon the parties entering into a written and authorized change order.
h. Attorney General's publicity accessible website, we strongly advise customers to visit the Attorney General's publicity website to gather current information on how to enforce their rights when constructing or repairing their homes. http://www.mainelegislature.org/legis/statutes/10/title10sec1487.html
i. Prices are only good for fifteen (15) days from said date.
j. The undersigned has authority as owner or owner's agent to authorize the work described in this contract.
k. Proposed system meets State of Maine minimum efficiency standard of 13SEER.

PROPOSED BY: _____ DATE: _____

ACCEPTED BY: [signature] DATE: 5/7/12

PROPOSAL MUST BE SIGNED AND RETURNED ALONG WITH THE FIRST PAYMENT BEFORE WORK CAN BEGIN. IN THE EVENT THAT THE OWNER FAILS, FOR ANY REASON, TO PAY FOR ALL LABOR, MATERIALS AND PARTS WITHIN THIRTY (30) DAYS OF THE DATE OF INVOICE, THE OWNER AGREES TO PAY, IN ADDITION TO ALL OTHER AMOUNTS DUE UNDER THIS CONTRACT, A FINANCE CHARGE COMPUTED AT A PERIODIC RATE OF 18%. OWNER ALSO AGREES TO PAY A $27.00 PENALTY FOR ANY DISHONORED CHECK. IN THE EVENT THAT OWNER FAILS, FOR ANY REASON, TO PAY FOR ALL LABOR, MATERIALS AND PARTS WITHIN THIRTY (30) DAYS OF THE DATE OF INVOICE, THE OWNER AGREES TO PAY TO GELINAS HVAC SERVICES INC ENFORCING ITS RIGHTS HEREUNDER.

AIR CONDITIONER
OUTDOOR UNIT

⚠ CAUTION

R410A
REFRIGERANT

This Air Conditioner contains and operates with refrigerant R410A.

THIS PRODUCT MUST ONLY BE INSTALLED OR SERVICED BY QUALIFIED PERSONNEL.

Refer to Commonwealth, State, Territory and local legislation, regulations, codes, installation & operation manuals, before the installation, maintenance and/or service of this product.

INSTALLATION MANUAL

English

For authorized personnel only.

MANUEL D'INSTALLATION

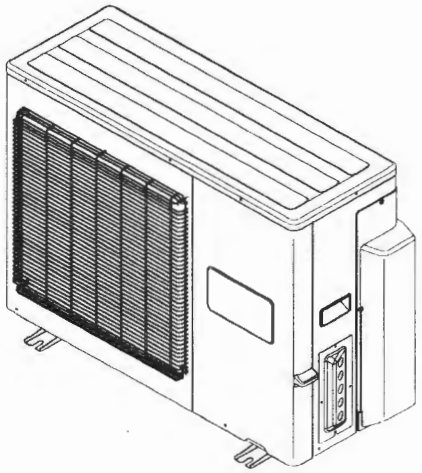
Français

Pour le personnel agréé uniquement.

MANUAL DE INSTALACIÓN

Español

Solo para personal autorizado.



PART NO. 9374747122

INSTALLATION MANUAL

PART NO. 9374747122

Contents

1. SAFETY PRECAUTIONS

This installation manual describes how to install the outdoor unit only. To install the indoor unit, refer to the installation manual included with the indoor unit.

IMPORTANT!

Please Read Before Starting

This air conditioning system meets strict safety and operating standards.
As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all danger, warning, and caution notices given in this manual.

DANGER: This mark indicates procedures which, if improperly performed, are most likely to result in the death or serious injury to the user or service personnel.

WARNING: This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

CAUTION: This symbol refers to a hazard or unsafe practice which can result in personal injury and the potential for product or property damage.

- Hazard alerting symbols


Electrical


Safety / alert

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

SPECIAL PRECAUTIONS

When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause accidental injury or death.
- Ground the unit following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing...

...In a Ceiling or Wall

Make sure the ceiling/wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.

...In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

...In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.

...In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised support that is higher than drifting snow. Provide snow vents.

When Connecting Refrigerant Tubing

- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigeration compressor oil (or equivalent) used for the outdoor unit to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.

NOTE:

Depending on the system type, liquid and gas lines may be either narrow or wide. Therefore, to avoid confusion the refrigerant tubing for your particular model is specified as either "small" or "large" rather than as "liquid" or "gas".

When Servicing

- Turn the power OFF at the main circuit breaker panel before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.
- After installation, explain correct operation to the customer, using the operating manual.

- Be sure to read this Manual thoroughly before installation.
- The warnings and precautions indicated in this Manual contain important information pertaining to your safety. Be sure to observe them.
- Hand this Manual, together with the Operating Manual, to the customer. Request the customer to keep them on hand for future use, such as for relocating or repairing the unit.
- After installation, explain correct operation to the customer, using the operating manual.

⚠

Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 5 minutes or more before touching electrical components.

⚠

During installation, make sure that the refrigerant pipe is attached firmly before you run the compressor. Do not operate the compressor under the condition of refrigerant piping not attached properly with 2-way or 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

Do not remove the connection pipe while the compressor is in operation with 2-way or 3-way valve open. This may cause abnormal pressure in the refrigeration cycle that leads to breakage and even injury.

When installing and relocating the air conditioner, do not mix gases other than the specified refrigerant (R410A) to enter the refrigerant cycle. If air or other gas enters the refrigerant cycle, the pressure inside the cycle will rise to an abnormally high value and cause breakage, injury, etc.

When installing this system in high humidity locations, install using ground fault equipment breakers (often referred to in other countries as an ELCB earth leakage current breaker) to reduce the risk of leaking current which may result in electric shock or potential fire.

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⚠
For the air conditioner to operate satisfactorily, install it as outlined in this installation manual.
Connect the indoor unit and outdoor unit with the air conditioner piping and cables available standards parts.This installation manual describes the correct connections using the installation set available from our standard parts.
Installation work must be performed in accordance with national wiring standards by authorized personnel only.
Also, do not use an extension cable.
Do not turn on the power until all installation work is complete.
Do not purge the air with refrigerants but use a vacuum pump to vacuum the installation.
There is not extra refrigerant in the outdoor unit for air purging.
Use a vacuum pump for R410A exclusively.
Using the same vacuum pump for different refrigerants may damage the vacuum pump or the unit.
Use a clean gauge manifold and charging hose for R410A exclusively.
If refrigerant leaks while work is being carried out, ventilate the area. If the refrigerant comes in contact with a flame, it produces a toxic gas.

- Be careful not to scratch the air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.
- Let the customer keep this installation manual because it is used when the air conditioner is serviced or moved.

2. ABOUT THE PRODUCT

2. 1. Precautions for using R410A refrigerant

⚠
The basic installation work procadures are the same as conventional refrigerant models. However, pay careful attention to the following points:
Since the working pressure is 1.6 times higher than that of conventional refrigerant (R22) models, some of the piping and installation and service tools are special. (See the table below.) Especially, when replacing a conventional refrigerant (R22) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.
Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant (R22) and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 UNF 20 threads per inch.]
Be careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant models. Also, when storing the piping, securely seal the openings by pinching, taping, etc.
When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

2. 2. Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals –0.1 to 5.3 MPa (–14.5 to 769 psi) for high pressure, –0.1 to 3.8 MPa (–14.5 to 551 psi) for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 40 mg/10 m (0.004oz/100ft). Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.
As an air conditioner using R410A incurs pressure higher than when using conventional refrigerant, it is necessary to choose adequate materials.
Thicknesses of copper pipes used with R410A are as shown in the table. Never use copper pipes thinner than that in the table even when it is available on the market.

Thicknesses of Annealed Copper Pipes (R410A)

Pipe outside diameter [mm (in.)]	Thickness [mm (in.)]
6.35 (1/4)	0.80 (1/32)
9.52 (3/8)	0.80 (1/32)
12.70 (1/2)	0.80 (1/32)
15.88 (5/8)	1.00 (5/128)
19.05 (3/4)	1.20 (3/64)

2. 3. Accessories

⚠
For installation purposes, be sure to use the parts supplied by the manufacturer or other prescribed parts. The use of non-prescribed parts can cause serious accidents such as the unit falling, water leakage, electric shock, or fire.

Do not throw away the connecting parts until the installation has been complete.

Name and shape	Q'ty	Application
Installation manual 	1	(This book)
Drain cap 	5	For outdoor unit drain piping work
Drain pipe 	1	
Adapter assy 12.7 mm → 9.52 mm (1/2 in.) (3/8 in.) 	1	For use when connecting models 7–12 to outdoor port A [24 type only]

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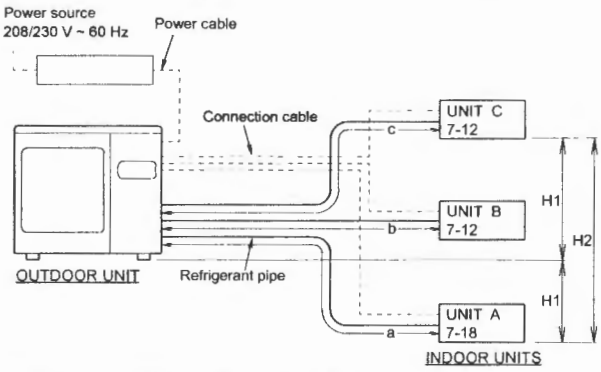
2. 4. System configuration

Layout example for the indoor units and outdoor unit

OUTDOOR UNIT : 24 type



2. 4. 1. Connectable indoor unit capacity type

⚠ CAUTION

The total capacity of the indoor units connected must be between 14,000 and 27,000 BTU.
Connection patterns are restricted. Normal operation is not guaranteed if connected pattern in the combination not listed below. The product may be damaged. Surely connect in accordance with the combination in the following connection pattern.

- To install an indoor unit, refer to the installation instruction sheet included with the indoor unit.

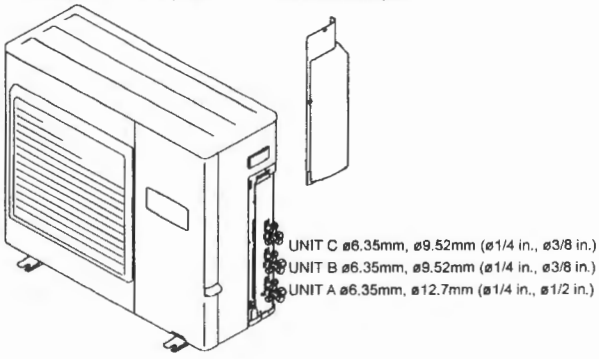
Indoor unit connection pattern

24 type

	Indoor unit		
	1	2	3
1	7,000	7,000	–
2	9,000	7,000	–
3	12,000	7,000	–
4	18,000	7,000	–
5	9,000	9,000	–
6	12,000	9,000	–
7	18,000	9,000	–
8	12,000	12,000	–
9	7,000	7,000	7,000
10	9,000	7,000	7,000
11	12,000	7,000	7,000
12	9,000	9,000	7,000
13	9,000	9,000	9,000

Outdoor port		Connectable model name
Standard port size [mm (in.)]		
C	6.35 (1/4) / 9.52 (3/8)	7 – 12
B	6.35 (1/4) / 9.52 (3/8)	7 – 12
A	6.35 (1/4) / 12.7 (1/2)	7 – 12*1)/18

*1) When connecting models 7–12 to the outdoor unit, the included adapter is necessary. For more information, refer to "4.1.3. How to use adapter".



2. 4. 2. Limitation of refrigerant piping length

⚠ CAUTION

The total maximum pipe lengths and height difference of this product are shown in the table.
If the units are further apart than this, correct operation cannot be guaranteed.

24 type

Total max. length (a+b+c)	50 m (164 ft)*1
Max. length for each indoor unit (a, b or c)	25 m (82 ft)
Max. height difference between outdoor unit and each indoor unit (H1)	15 m (49 ft)
Max. height difference between indoor units (H2)	10 m (33 ft)
Min. length for each indoor unit (a, b or c)	5 m (16 ft)
Total min. length (a+b+c)	15 m (49 ft)

*1 If the total piping is longer than 30 m (98 ft), additional refrigerant charging is necessary. (For more information, refer to "6.2 Additional charging".)

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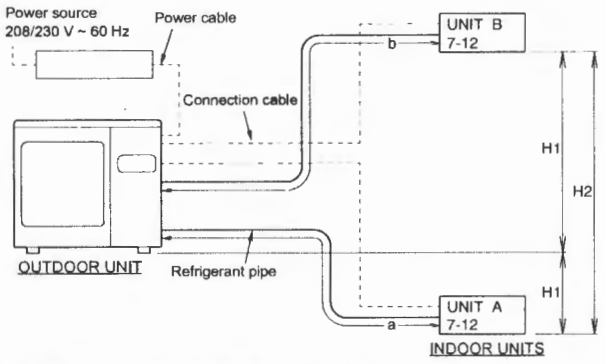
OUTDOOR UNIT : 18 type



2. 4. 3. Connectable indoor unit capacity type

⚠

The total capacity of the indoor units connected must be between 14,000 and 21,000 BTU.
Connection patterns are restricted. Normal operation is not guaranteed if connected pattern in the combination not listed below. The product may be damaged. Surely connect in accordance with the combination in the following connection pattern.

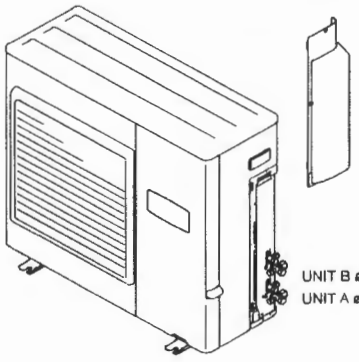
- To install an indoor unit, refer to the installation instruction sheet included with the indoor unit.

Indoor unit connection pattern

18 type

	Indoor unit	
	1	2
1	7,000	7,000
2	9,000	7,000
3	12,000	7,000
4	9,000	9,000
5	12,000	9,000

Outdoor port		Connectable model name
	Standard port size [mm (in.)]	
B	6.35 (1/4) / 9.52 (3/8)	7 – 12
A	6.35 (1/4) / 9.52 (3/8)	7 – 12



UNIT B ø6.35mm, ø9.52mm (ø1/4 in., ø3/8 in.)
UNIT A ø6.35mm, ø9.52mm (ø1/4 in., ø3/8 in.)

2. 4. 4. Limitation of refrigerant piping length

⚠

The total maximum pipe lengths and height difference of this product are shown in the table.
If the units are further apart than this, correct operation cannot be guaranteed.

18 type

Total max. length (a+b)	50 m (164 ft)*1
Max. length for each indoor unit (a or b)	25 m (82 ft)
Max. height difference between outdoor unit and each indoor unit (H1)	15 m (49 ft)
Max. height difference between indoor units (H2)	10 m (33 ft)
Min. length for each indoor unit (a or b)	5 m (16 ft)
Total min. length (a+b)	15 m (49 ft)

*1 If the total piping is longer than 30 m (98 ft), additional refrigerant charging is necessary. (For more information, refer to "6.2 Additional charging".)

2. 4. 5. Selecting pipe sizes

The diameters of the connection pipes differ according to the capacity of the indoor unit. Refer to the following table for the proper diameters of the connection pipes between the indoor and outdoor units.

Capacity of indoor unit	Gas pipe size (thickness) [mm (in.)]	Liquid pipe size (thickness) [mm (in.)]
7 – 12	ø9.52 (0.8) (3/8 (1/32))	ø6.35 (0.8) (1/4 (1/32))
18	ø12.7 (0.8) (1/2 (1/32))	ø6.35 (0.8) (1/4 (1/32))

⚠

Operation cannot be guaranteed if the correct combination of pipes, valves, etc., is not used to connect the indoor and outdoor units.

2. 4. 6. Heat insulation around connection pipes requirements

⚠

Install heat insulation around both the gas and liquid pipes.
Failure to do so may cause water leaks.
Use heat insulation with heat resistance above 248 °F. (Reverse cycle model only)
In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70%, install heat insulation around the refrigerant piping. If the expected humidity level is 70-80%, use heat insulation that is 19/32 in. or thicker and if the expected humidity exceeds 80%, use heat insulation that is 25/32 in. or thicker.
If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation. In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 68 °F).

Connect the connection pipes according to "4.1. Flare connection" in this installation manual.

2. 4. 7. Operating range

	Temperature	Indoor air intake	Outdoor air intake
Cooling	Maximum	90 °F DB	115 °F DB
	Minimum	65 °F DB	14 °F DB
Heating	Maximum	88 °F DB or less	75 °F DB
	Minimum	60 °F DB or less	5 °F DB

Indoor humidity about 80% or less

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3. INSTALLATION WORK

Please obtain the approval of the customer when selecting the location of installation and installing the unit.

3. 1. Selecting an installation location

⚠

Securely install the outdoor unit at a location that can withstand the weight of the unit. Otherwise, the outdoor unit may fall and cause injury.

Be sure to install the outdoor unit as prescribed, so that it can withstand earthquakes and typhoons or other strong winds. Improper installation can cause the unit to topple or fall, or other accidents.

Do not install the outdoor unit near the edge of a balcony. Otherwise, children may climb onto the outdoor unit and fall off of the balcony.

⚠

Do not install the outdoor unit in the following areas:

- Area with high salt content, such as at the seaside. It will deteriorate metal parts, causing the parts to fail or the unit to leak water.
- Area filled with mineral oil or containing a large amount of splashed oil or steam, such as a kitchen. It will deteriorate plastic parts, causing the parts to fail or the unit to leak water.
- Area that generates substances that adversely affect the equipment, such as sulfuric gas, chlorine gas, acid, or alkali. It will cause the copper pipes and brazed joints to corrode, which can cause refrigerant leakage.
- Area containing equipment that generates electromagnetic interference. It will cause the control system to malfunction, preventing the unit from operating normally.
- Area that can cause combustible gas to leak, contains suspended carbon fibers or flammable dust, or volatile inflammables such as paint thinner or gasoline. If gas leaks and settles around the unit, it can cause a fire.
- Area that has heat sources, vapors, or the risk of the leakage of flammable gas in the vicinity.
- Area where small animals may live. It may cause failure, smoke or fire if small animals enter and touch internal electrical parts.
- Area where animals may urinate on the unit or ammonia may be generated.

Please install the outdoor unit without slant.

Install the outdoor unit in a well-ventilated location away from rain or direct sunlight.

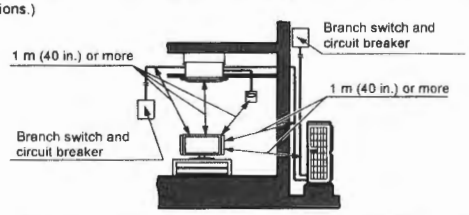
If the outdoor unit must be installed in an area within easy reach of the general public, install as necessary a protective fence or the like to prevent their access.

Install the outdoor unit in a location that would not inconvenience your neighbors, as they could be affected by the airflow coming out from the outlet, noise, or vibration. If it must be installed in proximity to your neighbors, be sure to obtain their approval.

If the outdoor unit is installed in a cold region that is affected by snow accumulation, snow fall, or freezing, take appropriate measures to protect it from those elements. To ensure a stable operation, install inlet and outlet ducts.

Install the outdoor unit in a location that is away from exhaust or the vent ports that discharge vapor, soot, dust, or debris.

Install the indoor unit, outdoor unit, power supply cable, connection cable, and remote control cable at least 1 m (40 in.) away from a television or radio receivers. The purpose of this is to prevent TV reception interference or radio noise. (Even if they are installed more than 1 m (40 in.) apart, you could still receive noise under some signal conditions.)



If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

Keep the length of the piping of the indoor and outdoor units within the allowable range.

For maintenance purposes, do not bury the piping.

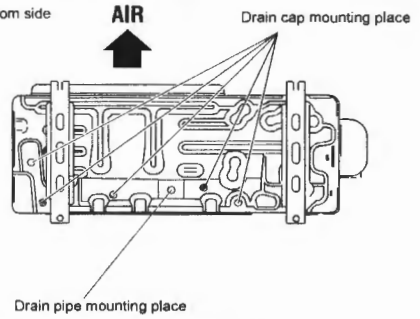
3. 2. Drain installation

⚠

Perform drain work in accordance with this Manual, and ensure that the drain water is properly drained. If the drain work is not carried out correctly, water may drip down from the unit, wetting the furniture.

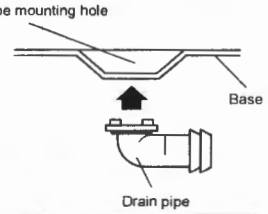
When the outdoor temperature is 32 °F or less, do not use the accessory drain pipe and drain cap. If the drain pipe and drain cap are used, the drain water in the pipe may freeze in extremely cold weather. (Reverse cycle model only)

Outdoor unit to be fasten with bolts at the four places indicated by the arrows without fail.



Since the drain water flows out of the outdoor unit during heating operation, install the drain pipe and connect it to a commercial 16 mm (5/8 in.) hose. (Reverse cycle model only)

When installing the drain pipe, plug all the holes other than the drain pipe mounting hole in the bottom of the outdoor unit with putty so there is no water leakage. (Reverse cycle model only)



3. 3. Installation dimensions

⚠

Install the unit where it will not be tilted by more than 3°. However, do not install the unit with it tilted towards the side containing the compressor.

When installing the outdoor unit where it may exposed to strong wind, fasten it securely.

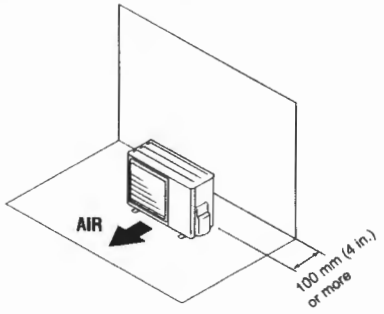
Decide the mounting position with the customer as follows:

(1) Install the outdoor unit in a location which can withstand the weight of the unit and vibration, and which can install horizontally.
(2) Provide the indicated space to ensure good airflow.
(3) If possible, do not install the unit where it will be exposed to direct sunlight. (If necessary, install a blind that does not interfere with the airflow.)
(4) Do not install the unit near a source of heat, steam, or flammable gas.
(5) During heating operation, drain water flows from the outdoor unit. Therefore, install the outdoor unit in a place where the drain water flow will not be obstructed. (Reverse cycle model only)
(6) Do not install the unit where strong wind blows or where it is very dusty.
(7) Do not install the unit where people pass.
(8) Install the outdoor unit in a place where it will be free from being dirty or getting wet by rain as much as possible.
(9) Install the unit where connection to the indoor unit is easy.

3. 3. 1. Single outdoor unit installation

When the upward area is open

- When there are obstacles at the back side.



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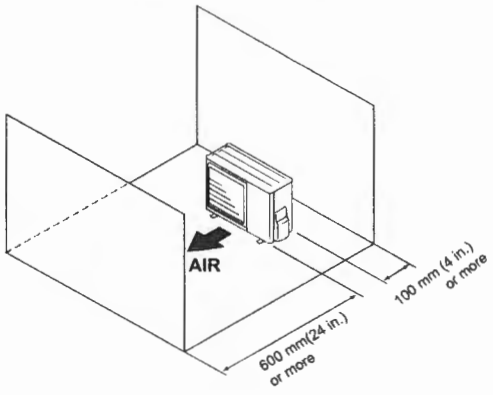
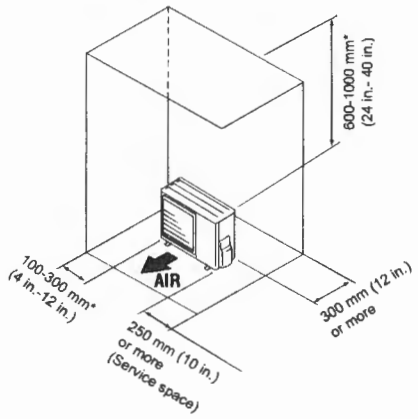
• When there are obstacles at the back and front sides.



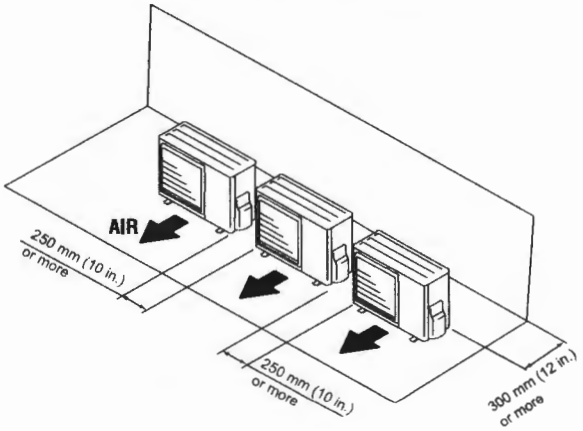
When an obstruction is present also in the upward area

• When there are obstacles at the back, side(s), and top.



* If the space is larger than that is stated, the condition will be the same as that there are no obstacles.

• When there are obstacles at the back side with the installation of more than one unit.



• No more than 3 units must be installed side by side.
When 3 units or more are arranged in a line, provide the space as shown in the following example when an obstruction is present also in the upward area.

3. 4. Transportation of the unit

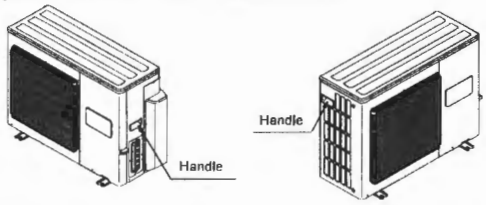
⚠

Do not touch the fins. Otherwise, personal injury could result.

⚠

When carrying the unit, hold the handles on the right and left sides and be careful. If the outdoor unit is carried from the bottom, hands or fingers may be pinched.

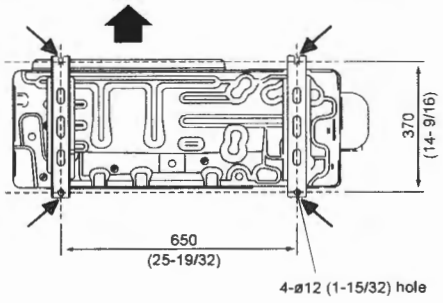
• Be sure to hold the handles on the sides of the unit. Otherwise, holding the suction grille on the sides of the unit may cause deformation.



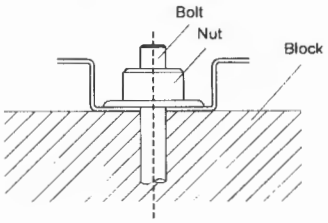
3. 5. Installation of the unit

- Install 4 anchor bolts at the locations indicated with arrows in the figure.
- To reduce vibration, do not install the unit directly on the ground. Install it on a secure base (such as concrete blocks).
- The foundation shall support the legs of the unit and have a width of 50mm (2 in.) or more.
- Depending on the installation conditions, the outdoor unit may spread its vibration during operation, which may cause noise and vibration. Therefore, attach damping materials (such as damping pads) to the outdoor unit during installation.
- Install the foundation, making sure that there is enough space for installing the connection pipes.
- Secure the unit to a solid block using foundation bolts. (Use 4 sets of commercially available M10 bolts, nuts, and washers.)
- The bolts should protrude 20 mm (0.78 in). (Refer to the figure.)
- If overturning prevention is required, purchase the necessary commercially available items.

Bottom side AIR (Unit : mm (in.))



Fix securely with bolts on a solid block. (Use 4 sets of commercially available M10 bolt, nut and washer.)



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4. PIPE INSTALLATION - 1

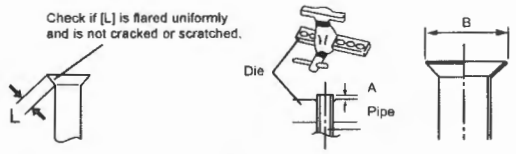
4. 1. Flare connection (pipe connection)

⚠ CAUTION
Do not use mineral oil on a flared part. Prevent mineral oil from getting into the system as this would reduce the lifetime of the units.
While welding the pipes, be sure to blow dry nitrogen gas through them.
The maximum lengths of this product are shown in the table. If the units are further apart than this, correct operation cannot be guaranteed.

Flaring

- Use special pipe cutter and flare tool exclusive for R410A.

(1) Cut the connection pipe to the necessary length with a pipe cutter.
(2) Hold the pipe downward so that the cuttings will not enter the pipe and remove any burrs.
(3) Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool. Leakage of refrigerant may result if other flare nuts are used.
(4) Protect the pipes by pinching them or with tape to prevent dust, dirt, or water from entering the pipes.



Pipe outside diameter [mm (in.)]	Dimension A [mm (in.)] Flare tool for R410A, clutch type	Dimension B $^{0}_{-0.4}$ [mm (in.)]
6.35 (1/4)	0 to 0.5 (0 to 1/32)	9.1 (3/8)
9.52 (3/8)		13.2 (17/32)
12.70 (1/2)		16.6 (21/32)
15.88 (5/8)		19.7 (25/32)
19.05 (3/4)		24.0 (15/16)

- When using conventional flare tools to flare R410A pipes, the dimension A should be approximately 1/32 in. more than indicated in the table (for flaring with R410A flare tools) to achieve the specified flaring. Use a thickness gauge to measure the dimension A.

Width across flats

Pipe outside diameter [mm (in.)]	Width across flats of Flare nut [mm (in.)]
6.35 (1/4)	17 (11/16)
9.52 (3/8)	22 (7/8)
12.70 (1/2)	26 (1-1/32)
15.88 (5/8)	29 (1-5/32)
19.05 (3/4)	36 (1-13/32)

4. 1. 1. Bending pipes

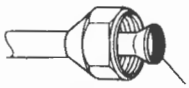
⚠ CAUTION
To prevent breaking of the pipe, avoid sharp bends. Bend the pipe with a radius of curvature of 100mm (4 in.) or more.
If the pipe is bent repeatedly at the same place, it will break.

- If pipes are shaped by hand, be careful not to collapse them.
- Do not bend the pipes at an angle of more than 90°.
- When pipes are repeatedly bent or stretched, the material will harden, making it difficult to bend or stretch them any more.
- Do not bend or stretch the pipes more than 3 times.

4. 1. 2. Pipe connection

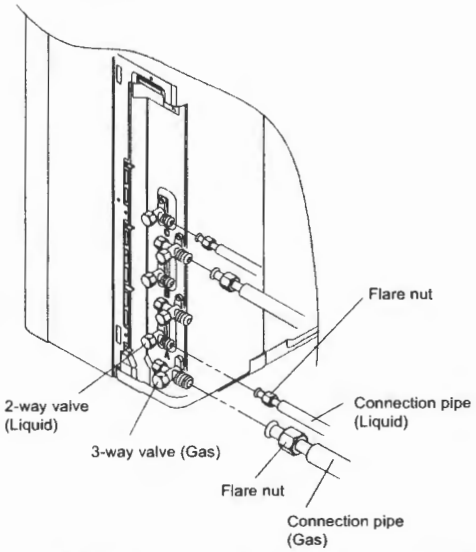
⚠ CAUTION
Be sure to install the pipe against the port on the indoor unit and the outdoor unit correctly. If the centering is improper, the flare nut cannot be tightened smoothly. If the flare nut is forced to turn, the threads will be damaged.
Do not remove the flare nut from the outdoor unit pipe until immediately before connecting the connection pipe.
After installing the piping, make sure that the connection pipes do not touch the compressor or outer panel. If the pipes touch the compressor or outer panel, they will vibrate and produce noise.

(1) Detach the caps and plugs from the pipes.
(2) Center the pipe against the port on the outdoor unit, and then turn the flare nut by hand.

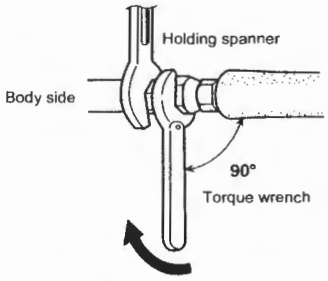


To prevent gas leakage, coat the flare surface with alkylbenzene oil (HAB). Do not use mineral oil.

(3) Attach the connection pipe.



(4) When the flare nut is tightened properly by your hand, use a torque wrench to finally tighten it.



⚠ CAUTION
Hold the torque wrench at its grip, keeping it in a right angle with the pipe, in order to tighten the flare nut correctly.

- Outer panel may be distorted if fastened only with a wrench. Be sure to fix the elementary part with a holding wrench (spanner) and fasten with a torque wrench (refer to below diagram). Do not apply force to the blank cap of the valve or hang a wrench, etc., on the cap. If blank cap is broken, it may cause leakage of refrigerant.

Flare nut [mm (in.)]	Tightening torque [N·m (lbf·in.)]
6.35 (1/4) dia.	16 to 18 (142 to 159)
9.52 (3/8) dia.	32 to 42 (283 to 372)
12.70 (1/2) dia.	49 to 61 (434 to 540)
15.88 (5/8) dia.	63 to 75 (558 to 664)
19.05 (3/4) dia.	90 to 110 (797 to 974)

4. 1. 3. How to use adapter (connection ports of outdoor unit)

- When using the ADAPTER, be careful not to overtighten the nut, or the smaller pipe may be damaged.
- Apply a coat of refrigeration oil to the threaded connection port of the outdoor unit where the flare nut comes in.
- Use appropriate wrenches to avoid damaging the connection thread by overtightening the flare nut.
- Apply wrenches on both of flare nut (local part), and ADAPTER to tighten them.

Adapter tightening torque

Adapter type [mm (in.)]	Tightening torque [N·m (lbf·in.)]
ø12.7 (1/2) → ø9.52 (3/8)	49 to 61 (434 to 540)

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5. ELECTRICAL WIRING

5. 1. The precautions of electrical wiring

⚠
Wiring connections must be performed by a qualified person in accordance with specifications. The rated supply of this product is 60Hz, 208/230V. Use a voltage within the range of 187-253V.
Before connecting the wires, make sure the power supply is OFF.
When installing this system in high humidity locations, install using ground fault equipment breakers (often referred to in other countries as an ELCB earth leakage current breaker) to reduce the risk of leaking current which may result in electric shock or potential fire.
Be sure to install a breaker of the specified capacity. When selecting breaker, please comply with the laws and the regulations of each country. One breaker must be installed on the power supply of the outdoor unit. Wrong selection and setup of the breaker will cause electric shock or fire.
Do not connect AC power supply to the transmission line terminal board. Improper wiring can damage the entire system.
Connect the connector cord securely to the terminal. Faulty installation can cause a fire.
Make sure to secure the insulation portion of the connector cable with the cord clamp. A damaged insulation can cause a short circuit.
Never install a power factor improvement condenser. Instead of improving the power factor, the condenser may overheat.
Before servicing the unit, turn the power supply switch OFF. Then, do not touch electric parts for 10 minutes due to the risk of electric shock.
Make sure to perform grounding work. Improper grounding work can cause electric shocks.

⚠
The primary power supply capacity is for the air conditioner itself, and does not include the concurrent use of other devices.
Do not use crossover power supply wiring for the outdoor unit.
If the electrical power is inadequate, contact your electric power company.
Install a breaker in a location that is not exposed to high temperatures. If the temperature surrounding the breaker is too high, the amperage at which the breaker cuts out may decrease.
We suggest installing GFEB breakers or follow local electrical code. This system uses an inverter, which means that when used with a ground fault breaker you must use breakers that can handle harmonics such as a (GFEB) Ground Fault Equipment Breaker (30 mA or greater) in order to prevent malfunctioning of ground fault device.
When the electrical switchboard is installed outdoors, place it under lock and key so that it is not easily accessible.
Do not fasten the power supply cable and connection cable together.
Always keep to the maximum length of the connection cable. Exceeding the maximum length may lead to erroneous operation.
The static electricity that is charged to the human body can damage the control PC Board when handling the control PC Board for address setting, etc. Please keep caution to the following points. Provide the grounding of Indoor unit, Outdoor unit and Option equipment. Cut off the power supply (breaker). Touch the metal section (such as the unpainted control box section) of the indoor or outdoor unit for more than 10 seconds. Discharge the static electricity in your body. Never touch the component terminal or pattern on the PC Board.

5. 2. Electrical requirement

⚠
Be sure to install a breaker of the specified capacity.
Regulation of cables and breaker differs from each locality, refer in accordance with local rules.

Voltage rating	1Φ 208/230V (60Hz)
Operating range	187-264V

Cable	Cable size *1)	Remarks
Power supply cable	10AWG	2 cable + Ground, 1 Ø 208/230V
Connection cable	14AWG	3 cable + Ground, 1 Ø 208/230V

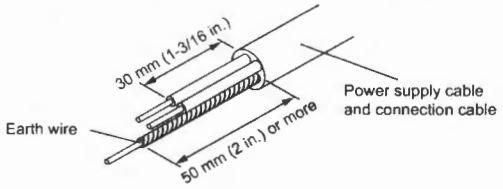
1) Selected sample: Select the correct cable type and size according to the country or region's regulations.
Max. wire length: Set a length so that the voltage drop is less than 2%. Increase the wire diameter when the wire length is long.

Breaker	Specification *2)
Circuit breaker (MOCP) *4)	Current : 25 (A)
Earth leakage breaker	Leakage current : 30mA 0.1sec or less *3)

2) Select the appropriate breaker of the described specification according to the national or regional standards.
3) Select the breaker that enough load current can pass through it.
4) MOCP: Maximum Over Current Protection

5. 3. Unit wiring

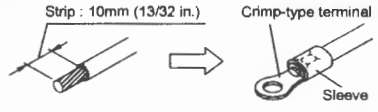
- When stripping off the coating of a lead wire, always use a special tool such as a wire stripper. If there is no special tool available, carefully strip the coating with a knife etc.

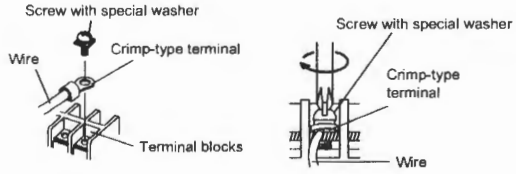


How to connect wiring to the terminal

Caution when wiring cable

(1) Use crimp-type terminals with insulating sleeves as shown in the figure to connect to the terminal block.
(2) Securely clamp the crimp-type terminals to the wires using an appropriate tool so that the wires do not come loose.
(3) Use the specified wires, connect them securely, and fasten them so that there is no stress placed on the terminals.
(4) Use an appropriate screwdriver to tighten the terminal screws. Do not use a screwdriver that is too small, otherwise, the screw heads may be damaged and prevent the screws from being properly tightened.
(5) Do not tighten the terminal screws too much, otherwise, the screws may break.
(6) See the table below for the terminal screw tightening torques.





	Tightening torque [N·m (lbf·in.)]
M4 screw	1.2 to 1.8 (10.6 to 15.9)

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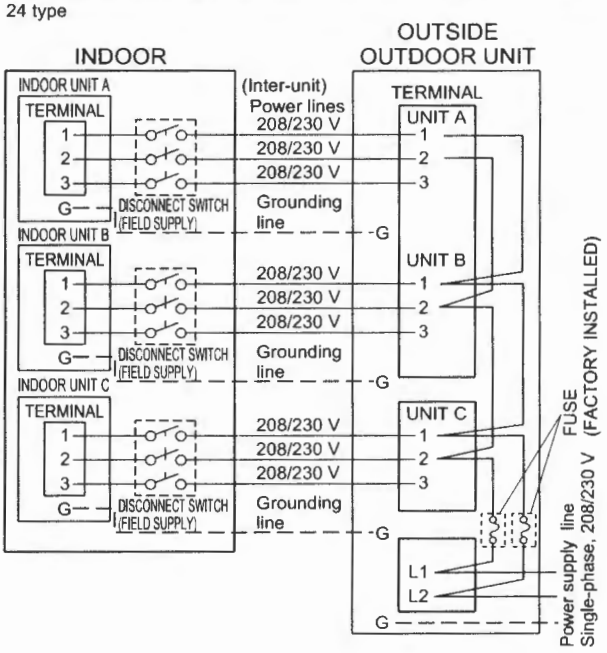
5. 4. Connection diagrams

24 type



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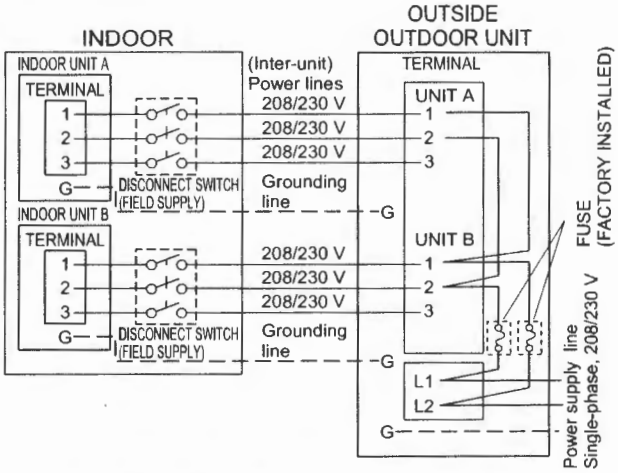


⚠

Disconnect switch and for over current protection given in the table below is to be installed between the indoor unit and the outdoor unit.

Disconnect switch
15A

⚠

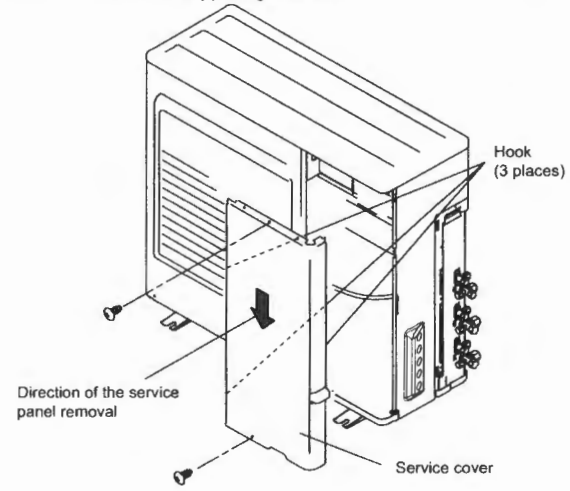
Be sure to refer the above diagram and do correct field wiring.
Wrong wiring causes malfunction of the unit.

Check local electrical codes and also any specific wiring instructions or limitation.

5. 5. Outdoor unit

(1) Service cover removal

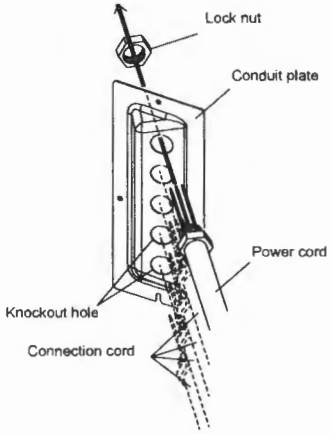
- Remove the two mounting screws.
- Remove the service cover by pushing downwards.



(2) Fasten the power supply cord and the connection cord to the conduit holder using the lock nut.
(Open the knock out holes with the tool so as not to transform conduit plate if necessary.)

(3) Connect the power supply cord and the connection cord to terminal.

(4) Fasten the power supply cord and connection cord with cord clamp.



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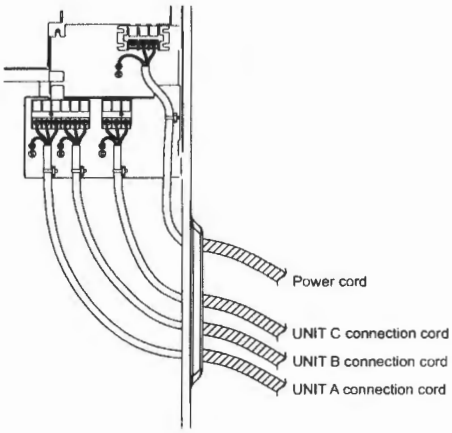

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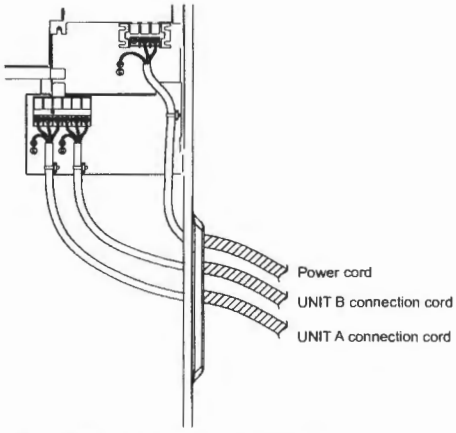
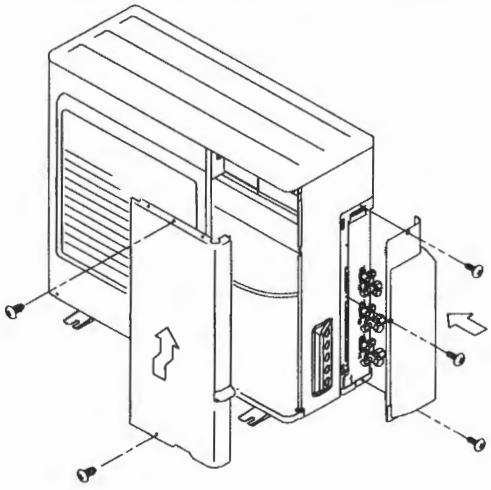


(5)Be sure to seal the holes when applying the putty.
Place the cords side by side. (Do not overlap the cords.)
(6)Put the service cover and valve cover back after completion of the work.



6. PIPE INSTALLATION - 2

6. 1. Vacuum

⚠
Always use a vacuum pump to purge the air.
Refrigerant for purging the air is not charged in the outdoor unit at the factory.
Refrigerant must not be discharged into atmosphere.
Use a vacuum pump, gauge manifold and charge hose for R410A exclusively. Using the same vacuum for different refrigerants may damage the vacuum pump or the unit.
After connecting the piping, check the joints for gas leakage with gas leak detector or soapy water.

6. 1. 1. Checking gas leakage and purging air

Gas leak checks are performed using either vacuum or nitrogen gas, so select the proper one depending on the situation.

Checking gas leaks with vacuum:

(1) Check if the piping connections are secure.
(2) Remove the cap of 3-way valve, and connect the gauge manifold charge hoses to the charging port of the 3-way valve.
(3) Open the valve of the gauge manifold fully.
(4) Operate the vacuum pump and start pump down.
(5) Check that the compound pressure gauge reads -0.1 MPa (-14.7 psi), operate the vacuum pump for 30 minutes or more in each valve.
(6) At the end of pump down, close the valve of the gauge manifold fully and stop the vacuum pump.
(It checks that leave as it is for about 10 minutes, and a needle does not return.)
(7) Disconnect the charge hose from the 3-way valve charging port.
(8) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench.
[torque: 6 to 7 N·m (53 to 62 lbf·in)].
(9) Tighten the blank caps and charging port cap of the 2-way valve and 3-way valve to the specified torque.

Checking gas leaks with nitrogen gas:

(1) Check if the piping connections are secure.
(2) Remove the cap of 3-way valve, and connect the gauge manifold charge hoses to the charging port of the 3-way valve.
(3) Pressurize with nitrogen gas using the 3-way valve charging port.
(4) Do not pressurize up to the specified pressure all at once but do so gradually.
① Increase the pressure up to 0.5 MPa (73 psi), let it sit for about 5 minutes and then check for any decrease in pressure.
② Increase the pressure up to 1.5 MPa (216 psi), let it sit for about 5 minutes and then check for any decrease in pressure.
③ Increase the pressure up to the specified pressure (the pressure designed for the product) and then make a note of it.
(5) Let it sit at the specified pressure and if there is no decrease in pressure then it is satisfactory. If a pressure decrease is confirmed, there is a leak, so it is necessary to specify the leak location and make minor adjustments.
(6) Discharge the nitrogen gas and starting removing the gas with a vacuum pump.
(7) Open the valve of the gauge manifold fully.
(8) Operate the vacuum pump and start pump down.
(9) Check that the compound pressure gauge reads -0.1 MPa (-14.7 psi), operate the vacuum pump for 30 minutes or more in each valve.
(10) At the end of pump down, close the valve of the gauge manifold fully and stop the vacuum pump.
(11) Disconnect the charge hose from the 3-way valve charging port.
(12) Remove the blank caps, and fully open the spindles of the 2-way and 3-way valves with a hexagon wrench.
[torque: 6 to 7 N·m (53 to 62 lbf·in)].
(13) Tighten the blank caps and charging port cap of the 2-way valve and 3-way valve to the specified torque.

Flare nut [mm (in.)]		Tightening torque [N·m (lbf·in.)]
Blank cap	6.35 (1/4)	20 to 25 (177 to 221)
	9.52 (3/8)	20 to 25 (177 to 221)
	12.70 (1/2)	28 to 32 (248 to 283)
	15.88 (5/8)	30 to 35 (288 to 310)
	19.05 (3/4)	35 to 40 (310 to 354)
Charging port cap		10 to 12 (89 to 106)

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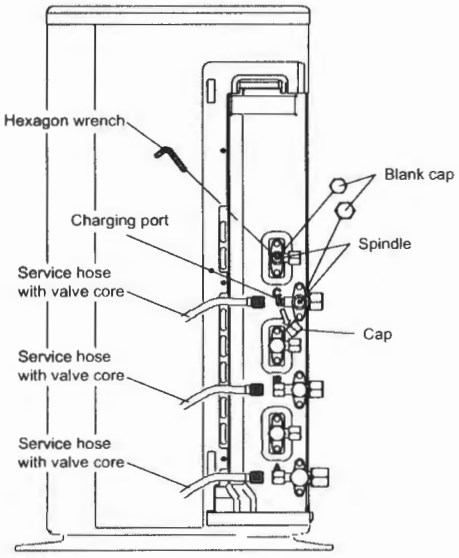
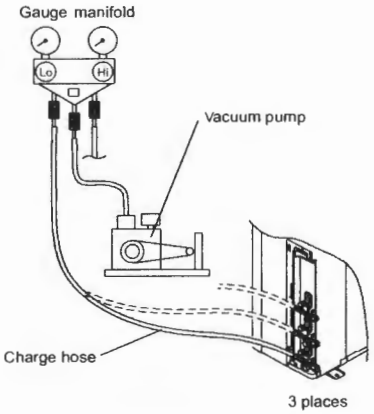




⚠ CAUTION

Do not purge the air with refrigerants, but use a vacuum pump to vacuum the installation! There is no extra refrigerant in the outdoor unit for air purging!

Use a vacuum pump and gauge manifold and charging hose for R410A exclusively. Using the same vacuum for different refrigerants may damage the vacuum pump or the unit.

6. 2. Additional charging

Refrigerant suitable for a total piping length of 98 ft is charged in the outdoor unit at the factory.
When the piping is longer than 98 ft, additional charging is necessary.
For the additional amount, see the table below.

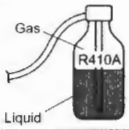
Total piping length	30m (98 ft)	40m (131 ft)	50m (164 ft)	
Additional refrigerant	None	200g (7.1 oz)	400g (14.1 oz)	20g/m (0.21 oz/ft)

⚠

When moving and installing the air conditioner, do not mix gas other than the specified refrigerant (R410A) inside the refrigerant cycle.

When charging the refrigerant R410A, always use an electronic balance for refrigerant charging (to measure the refrigerant by weight).

When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.



Add refrigerant from the charging valve after the completion of the work.

If the units are further apart than the maximum pipe length, correct operation cannot be guaranteed.

7. POWER

⚠

The rated voltage of this product is 208/230 V A.C. 60 Hz.

Before turning on verify that the voltage is within the 187 V to 253 V range.

Always use a special branch circuit and install a special receptacle to supply power to the air conditioner.

Use a special branch circuit breaker and receptacle matched to the capacity of the air conditioner. (Install in accordance with standard.)

Perform wiring work in accordance with standards so that the air conditioner can be operated safely and positively.

Install a leakage special branch circuit breaker in accordance with the related laws and regulations and electric company standards.

⚠ CAUTION

The power source capacity must be the sum of the air conditioner current and the current of other electrical appliances. When the current contracted capacity is insufficient, change the contracted capacity.

When the voltage is low and the air conditioner is difficult to start, contact the power company the voltage raised.

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8. TEST RUN

The test run method may be different for each indoor unit that is connected. Refer to the installation instruction sheet included with each indoor unit.

⚠

Always turn on the power 12 hours prior to the start of the operation in order to ensure compressor protection.

8. 1. Make a test run in accordance with the installation Manual for the indoor unit

(1) Indoor unit
① Is operation of each button on the remote control unit normal?
② Does each lamp light normally?
③ Do the air flow-direction louver operate normally?
④ Is the drain normal?
⑤ Is there any abnormal noise and vibration during operation?

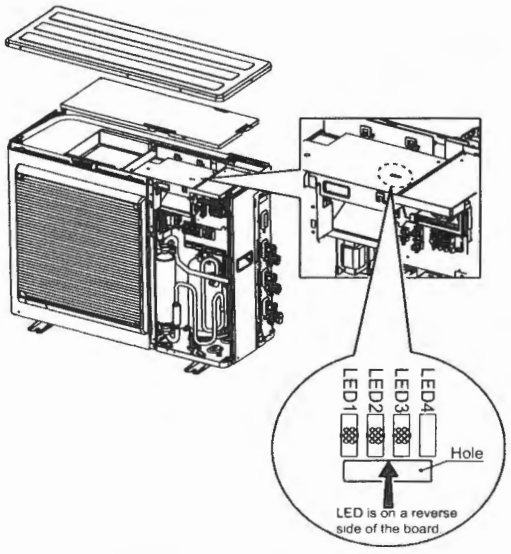
(2) Outdoor unit
① Is there any abnormal noise and vibration during operation?
② Will noise, wind, or drain water from the unit disturb the neighbors?
③ Is there any gas leakage?
• Do not operate the air conditioner in the test running state for a long time.
• For the operation method, refer to the operating manual and perform operation check.

8. 2. Outdoor unit LED

When a malfunction occurs in the outdoor unit, the LED on the circuit board lights to indicate the error. Refer to the following table for the description of each error according to the LED.

Error contents	LED1	LED2	LED3
Serial Communication error (Outdoor unit to Indoor unit A)	• 1 time	–	–
Serial Communication error (Outdoor unit to Indoor unit B)	–	• 1 time	–
Serial Communication error (Outdoor unit to Indoor unit C)*1	–	–	• 1 time
Discharge temp. sensor error	• 2 times	–	–
Outdoor unit Heat Ex. middle temp. sensor error	• 3 times	–	–
Outdoor temp. sensor error	• 4 times	–	–
2-way valve temp. sensor error (for Indoor unit A)	• 5 times	–	–
2-way valve temp. sensor error (for Indoor unit B)	–	• 5 times	–
2-way valve temp. sensor error (for Indoor unit C)*1	–	–	• 5 times
3-way valve temp. sensor error (for Indoor unit A)	• 6 times	–	–
3-way valve temp. sensor error (for Indoor unit B)	–	• 6 times	–
3-way valve temp. sensor error (for Indoor unit C)*1	–	–	• 6 times
Compressor temp. sensor error	• 7 times	–	–
Heat sink temp. sensor error	• 8 times	–	–
High pressure switch 1 error	• 9 times	–	–
High pressure switch 2 error	• 10 times	–	–
Indoor unit capacity error	• 11 times	–	–
Trip detection	• 12 times	–	–
Compressor rotor position detection error	• 13 times	–	–
Trip terminal L error	• 14 times	–	–
Outdoor unit fan motor error	• 15 times	–	–
Outdoor unit PCB microcomputer communication error	• 17 times	–	–
Discharge temperature error	• 18 times	–	–
Compressor temperature error	• 19 times	–	–
4-way valve error	• 20 times	–	–
Outdoor unit PCB model information error	• 21 times	–	–
Active filter error, PFC circuit error	• 22 times	–	–

• : flashing – : Off
*1: 24 type only



8. 3. Confirming the operation of indoor unit

Run the unit in a normal way, and confirm its operation. (Please end the test run first before confirmation)
(1) Cold air (or warm air) must be discharged from the indoor unit.
(2) The indoor unit operates normally when air direction or air volume adjustment buttons pressed.

9. PUMP DOWN

PUMP DOWN OPERATION
To avoid discharging refrigerant into the atmosphere at the time of relocation or disposal, recover refrigerant by doing the cooling operation or forced cooling operation according to the following procedure. (When the cooling operation cannot start in winter, and so on, start the forced cooling operation.)
(1) Do the air purging of the charge hose by connecting the charging hose of gauge manifold to the charging port of 3 way valve (At lease one unit of connected units) and opening the low pressure valve slightly.
(2) Close the valve stem of 2 way valve (All connected units) completely.
(3) Start the cooling operation or following forced cooling operation. (All connected units) When using the remote control unit Press the TEST RUN button after starting the cooling operation by the remote control unit. The operation indicator lamp and timer indicator lamp will begin to flash simultaneously during test run. When using the MANUAL AUTO button of the indoor unit (The remote control unit is lost, and so on.) Keep on pressing the MANUAL AUTO button of the indoor unit for more than 10 seconds. (The forced cooling operation cannot start if the MANUAL AUTO button is not kept on pressing for more than 10 seconds.)
(4) Close the valve stem of 3 way valve (All connected units) when the reading on the compound pressure gauge becomes 0.05 ~ 0 MPa (7.3 ~ 0 psi).
(5) Stop the operation. (All connected units) Press the START/STOP button of the remote control unit to stop the operation. Press the MANUAL AUTO button when stopping the operation from indoor unit side. (It is not necessary to press on keeping for more than 10 seconds.)

⚠

During the pump-down operation, make sure that compressor is off before you remove the refrigerant piping. Do not remove the connection pipe while the compressor is in operation with 2 or 3 way valve open. This may cause abnormal pressure in the refrigeration cycle that breakage and injury.

10. CUSTOMER GUIDANCE

Explain the following to the customer in accordence with the operating manual:

(1) Starting and stopping method, operation switching, temperature adjustment, timer, air flow adjustment, and other remote control unit operations.

(2) Air filter removal and cleaning.

(3) Give the operating manual and installation instruction sheet to the customer.

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AIR CONDITIONER
INDOOR UNIT
Slim Duct Type

⚠ CAUTION

R410A
REFRIGERANT

This Air Conditioner contains and operates with refrigerant R410A.

THIS PRODUCT MUST ONLY BE INSTALLED OR SERVICED BY QUALIFIED PERSONNEL.

Refer to Commonwealth, State, Territory and local legislation, regulations, codes, installation & operation manuals, before the installation, maintenance and/or service of this product.

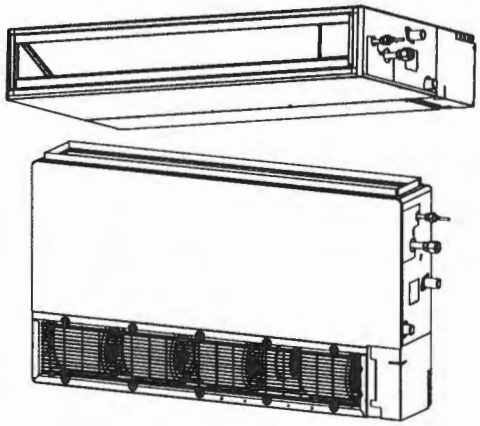
English

Français

Español

INSTALLATION MANUAL

For authorized service personnel only.



Contents

PART NO. 9374342105-05

1. SAFETY PRECAUTIONS

1.1.IMPORTANT! Please Read Before Starting

This air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so it operates safely and efficiently.

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all danger, warning, and caution notices given in this manual.

WARNING: This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.

CAUTION: This symbol refers to a hazard or unsafe practice which can result in personal injury and the potential for product or property damage.

- Hazel alerting symbols

 •• Electrical

 •• Safety / alert

If Necessary, Get Help

These instructions are all you need for most installation sites and maintenance conditions. If you require help for a special problem, contact our sales/service outlet or your certified dealer for additional instructions.

In Case of Improper Installation

The manufacturer shall in no way be responsible for improper installation or maintenance service, including failure to follow the instructions in this document.

1.2.Special precautions

When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED, EXPERIENCED ELECTRICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.
- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause **accidental injury or death**.
- **Ground the unit** following local electrical codes.
- Connect all wiring tightly. Loose wiring may cause overheating at connection points and a possible fire hazard.

When Transporting

Be careful when picking up and moving the indoor and outdoor units. Get a partner to help, and bend your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut your fingers.

When Installing...

...In a Ceiling or Wall

Make sure the ceiling/wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.

...In a Room

Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.

...In Moist or Uneven Locations

Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the outdoor unit. This prevents water damage and abnormal vibration.

...In an Area with High Winds

Securely anchor the outdoor unit down with bolts and a metal frame.

...In a Snowy Area (for Heat Pump-type Systems)

Install the outdoor unit on a raised platform that is higher than drifting snow.

When Connecting Refrigerant Tubing

- Keep all tubing runs as short as possible.
- Use the flare method for connecting tubing.
- Apply refrigerant lubricant to the matching surfaces of the flare and union tubes before connecting them, then tighten the nut with a torque wrench for a leak-free connection.
- Check carefully for leaks before starting the test run.

When Servicing

- Turn the power OFF at the main circuit breaker panel before opening the unit to check or repair electrical parts and wiring.
- Keep your fingers and clothing away from any moving parts.
- Clean up the site after you finish, remembering to check that no metal scraps or bits of wiring have been left inside the unit being serviced.
- After installation, explain correct operation to the customer, using the operating manual.

⚠ DANGER
Never touch electrical components immediately after the power supply has been turned off. Electrical shock may occur. After turning off the power, always wait 5 minutes or more before touching electrical components.

2. ABOUT THE UNIT

2.1.Precautions for using R410A refrigerant

The basic installation work procedures are the same as conventional refrigerant (R22) models.

However, pay careful attention to the following points:

- Since the working pressure is 1.6 times higher than that of conventional refrigerant (R22) models, some of the piping and installation and service tools are special. (See the table below.)

  Especially, when replacing a conventional refrigerant (R22) model with a new refrigerant R410A model, always replace the conventional piping and flare nuts with the R410A piping and flare nuts.

- Models that use refrigerant R410A have a different charging port thread diameter to prevent erroneous charging with conventional refrigerant (R22) and for safety. Therefore, check beforehand. [The charging port thread diameter for R410A is 1/2 inch.]

- Be more careful that foreign matter (oil, water, etc.) does not enter the piping than with refrigerant (R22) models. Also, when storing the piping, securely seal the opening by pinching, taping, etc.

- When charging the refrigerant, take into account the slight change in the composition of the gas and liquid phases, and always charge from the liquid phase side whose composition is stable.

2.2.Special tools for R410A

Tool name	Contents of change
Gauge manifold	Pressure is high and cannot be measured with a conventional gauge. To prevent erroneous mixing of other refrigerants, the diameter of each port has been changed. It is recommended the gauge with seals 30 in. Hg to 768 psi for high pressure. 30 in. Hg to 551 psi for low pressure.
Charge hose	To increase pressure resistance, the hose material and base size were changed.
Vacuum pump	A conventional vacuum pump can be used by installing a vacuum pump adapter.
Gas leakage detector	Special gas leakage detector for HFC refrigerant R410A.

Copper pipes

It is necessary to use seamless copper pipes and it is desirable that the amount of residual oil is less than 0.0014 oz/10 m (33 ft). Do not use copper pipes having a collapsed, deformed or discolored portion (especially on the interior surface). Otherwise, the expansion value or capillary tube may become blocked with contaminants.
As an air conditioner using R410A incurs pressure higher than when using R22, it is necessary to choose adequate materials. Thicknesses of copper pipes used with R410A are as shown in the table. Never use copper pipes thinner than that in the table even when it is available on the market.

⚠ WARNING

Do not use the existing (for R22) piping and flare nuts.

- If the existing materials are used, the pressure inside the refrigerant cycle will rise and cause failure, injury, etc. (Use the special R410A materials.)

When installing and relocating the air conditioner, do not mix gases other than the specified refrigerant (R410A) to enter the refrigerant cycle.

- If air or other gas enters the refrigerant cycle, the pressure inside the cycle will rise to an abnormally high value and cause failure, injury, etc.

2.3. For authorized service personnel only.

⚠ WARNING

For the air conditioner to operate satisfactorily, install it as outlined in this installation manual.

Connect the indoor unit and outdoor unit with the air conditioner piping and cords available from your local distributor. This installation manual describes the correct connections using the installation set available from your local distributor.

Installation work must be performed in accordance with national wiring standards by authorized personnel only.

Do not turn on the power until all installation work is complete.

⚠ CAUTION

This installation manual describes how to install the indoor unit only. To install the outdoor unit, refer to the installation manual included with the outdoor unit.

- Be careful not to scratch the air conditioner when handling it.
- After installation, explain correct operation to the customer, using the operating manual.

4. ELECTRICAL REQUIREMENT

Always make the air conditioner power supply a special branch circuit and provide a special switch and receptacle. Do not extend the power cable.

⚠ WARNING

Refer to local codes for acceptable cable type.

Cable	Cable size	Remarks
Connection cable	14 AWG	3 cable + Ground 1Φ 208/230 V

Max. Cable Length: Limit voltage drop to less than 2%. Increase cable gauge if voltage drop is 2% or more.

5. SELECTING THE MOUNTING POSITION

Correct initial installation location is important because it is difficult to move unit after it is installed.

⚠ WARNING

Select installation locations that can properly support the weight of the indoor. Install the units securely so that they do not topple or fall.

⚠ CAUTION

Do not install the unit in the following areas:
- Area with high salt content, such as at the seaside.
  It will deteriorate metal parts, causing the parts to fail or the unit to leak water.
- Area filled with mineral oil or containing a large amount of splashed oil or steam, such as a kitchen.
  It will deteriorate plastic parts, causing the parts to fail or the unit to leak water.
- Area that generates substances that adversely affect the equipment, such as sulfuric gas, chlorine gas, acid, or alkali.
  It will cause the copper pipes and brazed joints to corrode, which can cause refrigerant leakage.
- Area that can cause combustible gas to leak, contains suspended carbon fibers or flammable dust, or volatile inflammables such as paint thinner or gasoline.
  If gas leaks and settles around the unit, it can cause a fire.
- Area where animals may urinate on the unit or ammonia may be generated.

Do not use the unit for special purposes, such as storing food, raising animals, growing plants, or preserving precision devices or art objects.
It can degrade the quality of the preserved or stored objects.

Do not install where there is the danger of combustible gas leakage.

⚠ CAUTION

Do not install the unit near a source of heat, steam, or flammable gas.

Install the unit where drainage does not cause any trouble.

Install the indoor unit, outdoor unit, power supply cable, and remote control cable at least 40 in. (1 m) away from a television or radio receivers. The purpose of this is to prevent TV reception interference or radio noise.
(Even if they are installed more than 40 in. (1 m) apart, you could still receive noise under some signal conditions.)

If children under 10 years old may approach the unit, take preventive measures so that they cannot reach the unit.

- **Decide the mounting position with the customer as follows:**

(1) Install the indoor unit on a place having a sufficient strength so that it withstands against the weight of the indoor unit.

(2) The inlet and outlet ports should not be obstructed; the air should be able to blow all over the room.

(3) Leave the space required to service the air conditioner.

(4) A place from where the air can be distributed evenly throughout the room by the unit.

(5) Install the unit where connection to the outdoor unit is easy.

(6) Install the unit where the connection pipe can be easily installed.

(7) Install the unit where the drain pipe can be easily installed.

(8) Install the unit where noise and vibrations are not amplified.

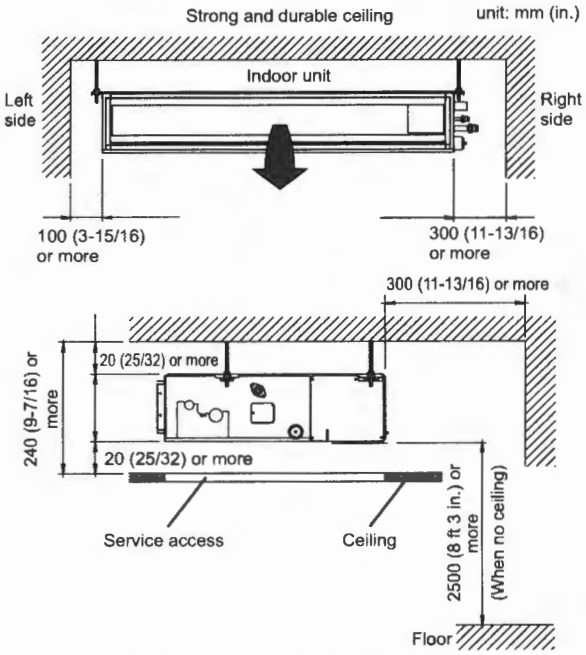
(9) Take servicing, etc., into consideration and leave the spaces. Also install the unit where the filter can be removed.

6. INSTALLATION WORK

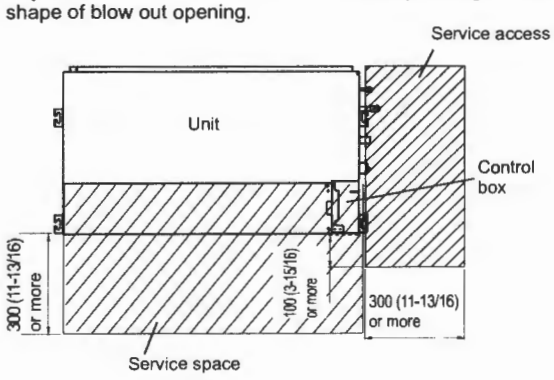
6.1A. Installation dimensions (Ceiling concealed type)

Provide a service access for inspection purposes.
Do not place any wiring or illumination in the service space, as they will impede service.

Installation Dimensions

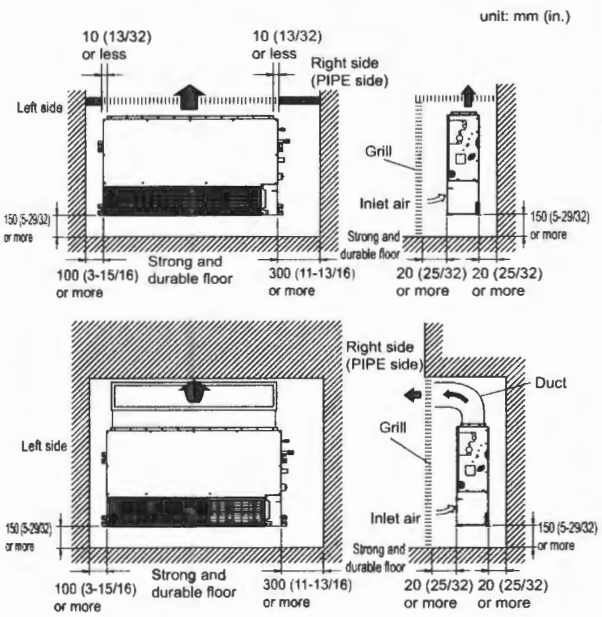


Adjust the wind direction in the room depending on the shape of blow out opening.



6.1B. Installation dimensions (Wall mounted type/Floor standing concealed type)

The wall mounted type/floor standing concealed type requires a temperature correction setting. Perform this in "10.3. Function setting".



6.2A. Installation the unit (Ceiling concealed type)

⚠ WARNING

Install the air conditioner in a location which can withstand a load do at least 5 times the weight of the main unit and which will not amplify sound or vibration. If the installation location is not strong enough, the indoor unit may fall and cause injuries.

If the job is done with the panel frame only, there is a risk that the unit will come loose. Please take care.

6.2A.1. UNIT INSTALLATION EXAMPLE (CEILING CONCEALED TYPE)

Connect the locally purchased duct.

(1) Inlet side

- Connect the duct to the locally purchased inlet flange.
- Connect the flange to the body with the locally purchased tapping screws.
- Wind the inlet flange connecting to the duct with the aluminum tape etc. to avoid the air discharge.

⚠ CAUTION

When the duct is connected to inlet side, remove contained filter and surely attach locally purchased filter at inlet opening.

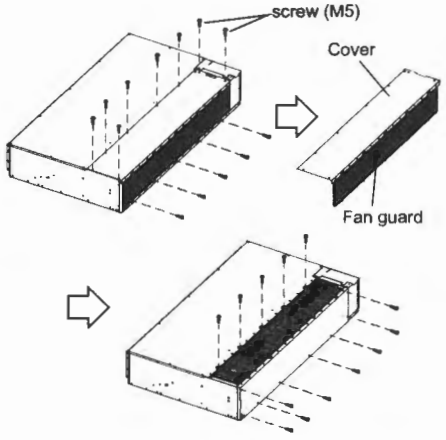
(2) Outlet side

- Connect the duct with adjusting inside of outlet flange.
- Wind the outlet flange connecting to the duct with the aluminum tape etc. to avoid the air discharge.
- Insulate the duct to avoid the dew condensation.

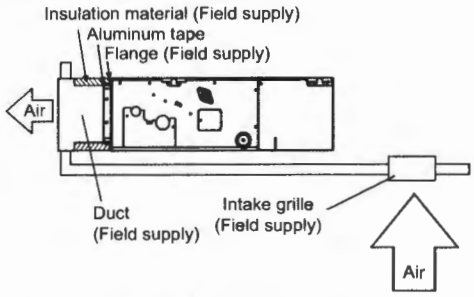
⚠ CAUTION
Check that duct work does not exceed the range of external static pressure of equipment.
Make sure to insulate ducts to avoid condensation.
Make sure to insulate between ducts and walls if metal ducts are used.
Please explain handling and washing methods of locally purchased materials to the customer.
To prevent people from touching the parts inside the unit, be sure to install grilles on the inlet and outlet ports. The grilles must be designed in such a way that cannot be removed without tools.
When connecting the duct to the outlet port of the indoor unit, be sure to insulate the outlet port and the installation screws to prevent water from leaking around the port.
AR9/12/18 Model • Set the static pressure outside the unit to 0.36 in. WG or less (the allowable range is between 0 and 0.36 in. WG). AR24 Model • Set the static pressure outside the unit to 0.2 in. WG or less (the allowable range is between 0 and 0.2 in. WG).

Replace the cover as follows.
- Remove the screws, and then remove cover and fan guard.
- Install the cover with the screws as shown in the illustration below.

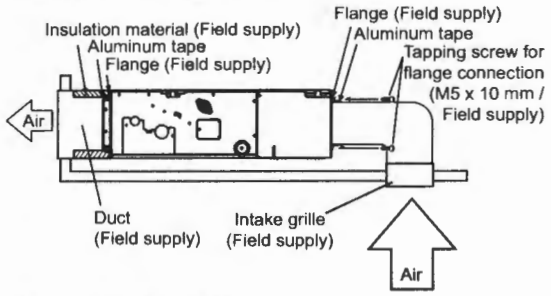
Model	Screw
	M5
AR9/12	9
AR18	11
AR24	13



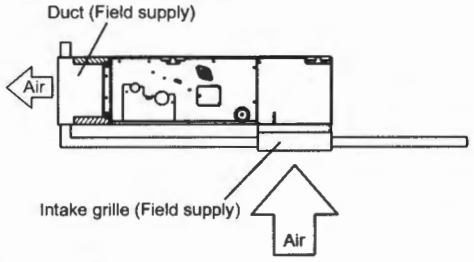
Side Inlet - Side Outlet



Side Inlet - Side Outlet (Duct)

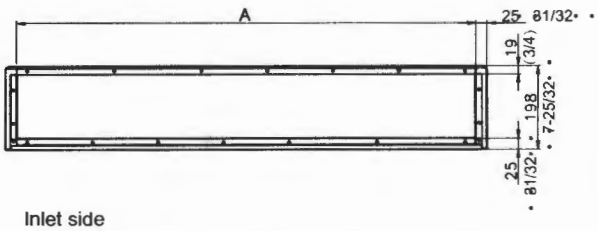


Bottom Inlet - Side Outlet

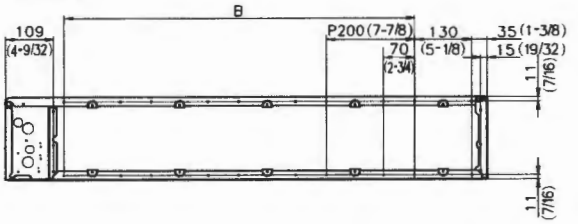


Outlet side

unit: mm (in.)



Inlet side

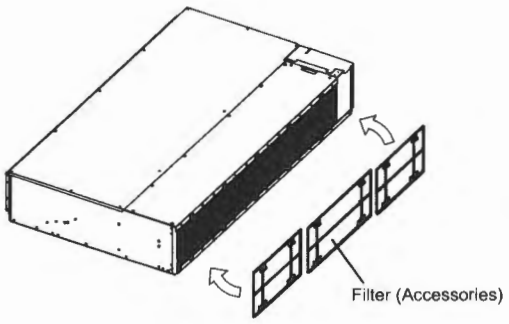


unit: mm (in.)

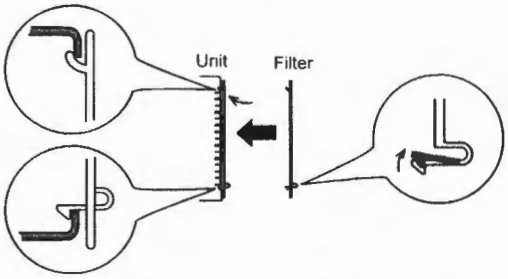
	AR9/12	AR18	AR24
A	650 (25-19/32)	850 (33-15/32)	1050 (41-11/32)
B	P200 (7-7/8) × 2 = 400 (15-3/4)	P200 (7-7/8) × 3 = 600 (23-5/8)	P200 (7-7/8) × 4 = 800 (31-1/2)

6.2A.2. INSTALL THE FILTERS

• Install the filters to the unit.

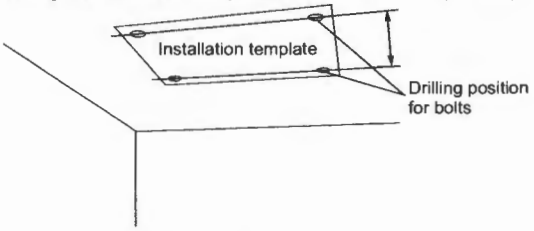


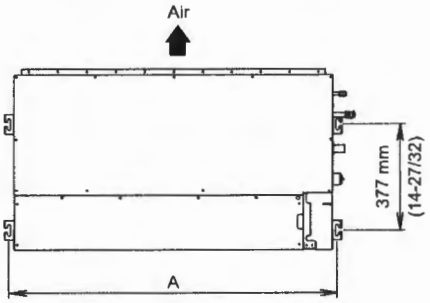
AR9/12/18: 2 filters
AR24: 3 filters



6.2A.3. DRILLING HOLES FOR BOLTS AND INSTALLING THE BOLTS

• Using the installation template, drill holes for bolts (4 holes).



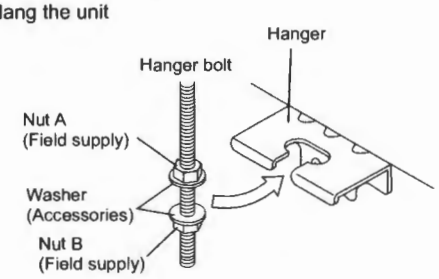


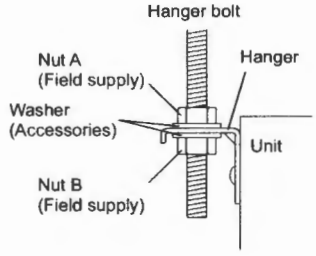
unit: mm (in.)

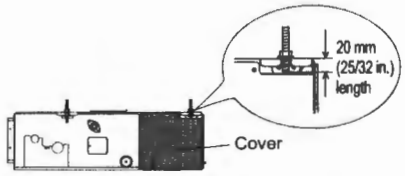
	AR9/12	AR18	AR24
A	734 (28-29/32)	934 (36-25/32)	1134 (44-21/32)

6.2A.4. FIX THE UNIT

(1) Hang the unit



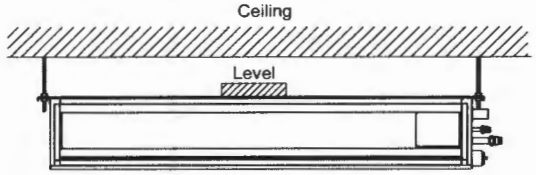


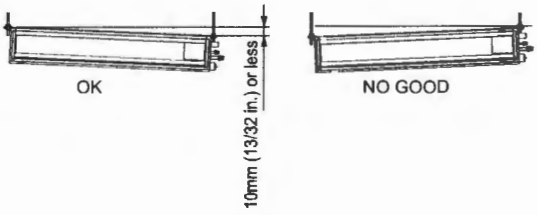


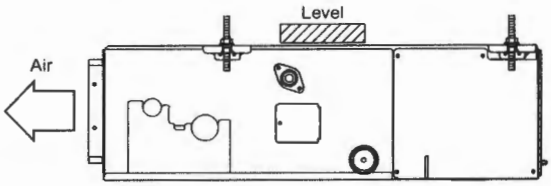
*: It might become difficult to open and shut the Cover /control box cover when the length exceeds 20 mm (25/32 in.).

(2) Leveling

Base horizontal direction leveling on top of the unit.







⚠ CAUTION
Leave a space of 100 mm (3-15/16 in.) or more between the inlet port and the ceiling.
Fasten the unit securely with Special nuts A and B.

6.2B. Install the unit (Wall mounted type/ Floor standing concealed type)

⚠ WARNING
Install the air conditioner in a location which can withstand a load do at least 5 times the weight of the main unit and which will not amplify sound or vibration. If the installation location is not strong enough, the indoor unit may fall and cause injuries.
If the job is done with the panel frame only, there is a risk that the unit will come loose. Please take care.

6.2B.1. UNIT INSTALLATION EXAMPLE (Wall mounted type/Floor standing concealed type)

Connect the locally purchased duct.

(1) Inlet side

- Connect the duct to the locally purchased inlet flange.
- Connect the flange to the body with the locally purchased tapping screws.
- Wind the inlet flange connecting to the duct with aluminum tape etc. to avoid the air discharge.

⚠ CAUTION
When duct is connected to inlet side, remove filter provided with unit and attach locally purchased filter at return air grille or in return duct.

(2) Outlet side

- Connect the duct to outlet flange.
- Wind the outlet flange connecting to the duct with aluminum tape etc. to avoid the air discharge.
- Insulate the duct to avoid condensation.

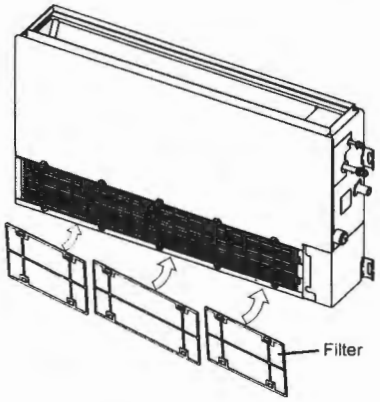
⚠ CAUTION
Check that duct work does not exceed the range of external static pressure of equipment.
Make sure to insulate ducts to avoid condensation.
Make sure to insulate between ducts and walls if metal ducts are used.
Please explain handling and washing methods of locally purchased materials to the customer.
To prevent people from touching the parts inside the unit, be sure to install grilles on the inlet and outlet ports. The grilles must be designed in such a way that cannot be removed without tools.
When connecting the duct to the outlet port of the indoor unit, be sure to insulate the outlet port and the installation screws to prevent water from leaking around the port.
AR9/12/18 Model • Set the static pressure outside the unit to 0.36 in. WG or less (the allowable range is between 0 and 0.36 in. WG). AR24 Model • Set the static pressure outside the unit to 0.2 in. WG or less (the allowable range is between 0 and 0.2 in. WG).

- Remove the screws, and then remove cover and fan guard.
- Install the cover with the screws as shown in the illustration below.

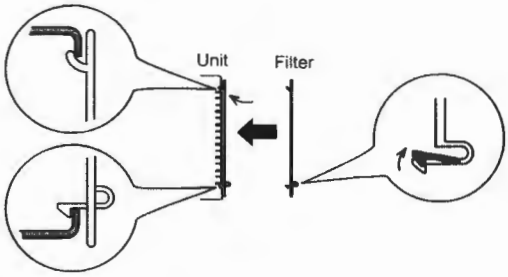
Model	Screw
	M5
AR9/12	9
AR18	11
AR24	13

6.2B.2. INSTALL THE FILTER

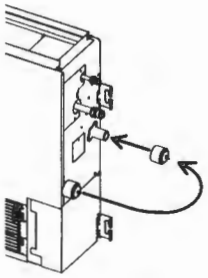
- Install the filters (Accessories) to the unit.



AR9/12/18: 2 filters
AR24: 3 filters



Replace drain cap



⚠ CAUTION

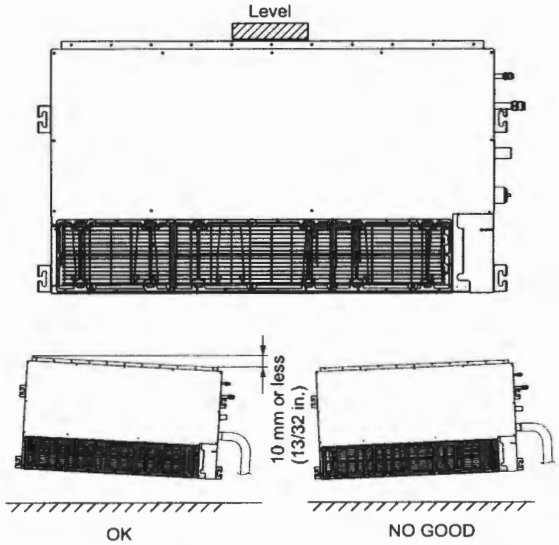
- Set "10.4. Jumper wire setting of Drainage function setting (JM1)".
- Drain pump cannot be used if it is installed in wall mounted type/floor standing concealed type.

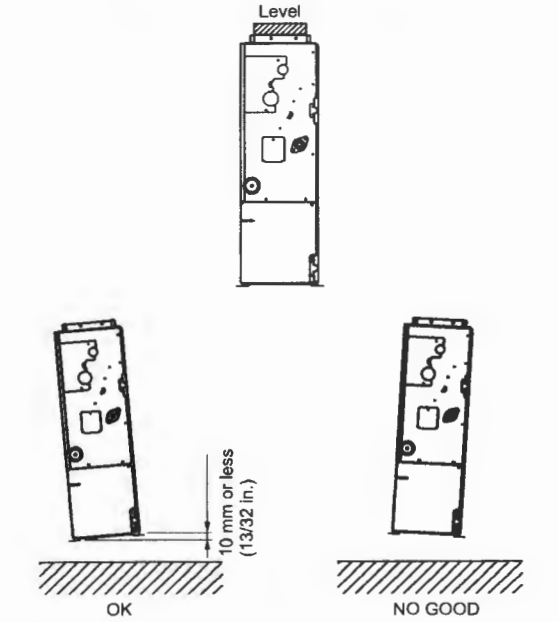
6.2B.3. INSTALLING THE UNIT

- To prevent overturning, attach the unit to the floor or the wall.
- To avoid vibration of the unit, install vibration isolation pad between the unit and the floor or the wall.

Leveling

Level unit before attaching to floor or wall.





⚠ CAUTION

Fasten the unit securely with Special nuts A and B.

7. PIPE INSTALLATION

⚠ CAUTION

Be careful that foreign matter (oil, water, etc.) does not enter the piping with refrigerant R410A models. Also, when storing the piping, securely seal the openings by pinching, taping, etc.

While brazing the pipes, be sure to purge with dry nitrogen gas.

7.1. Selecting the pipe material

⚠ CAUTION

Do not use existing pipes.

Use pipes that have clean external and internal sides without any contamination which may cause trouble during use, such as sulfur, oxide, dust, cutting waste, oil, or water.

It is necessary to use seamless copper pipes.
Material : Phosphor deoxidized seamless copper pipes
It is desirable that the amount of residual oil is less than 40 mg/10 m (33 ft).

Do not use copper pipes that have a collapsed, deformed, or discolored portion (especially on the interior surface). Otherwise, the expansion valve or capillary tube may become blocked with contaminants.

Improper pipe selection will degrade performance. As an air conditioner using R410A incurs pressure higher than when using conventional refrigerant, it is necessary to choose adequate materials.

- Thicknesses of copper pipes used with R410A are as shown in the table.
- Never use copper pipes thinner than those indicated in the table even if they are available on the market.

Thicknesses of Annealed Copper Pipes (R410A)

Pipe outside diameter [mm (in.)]	Thickness [mm (in.)]
6.35 (1/4)	0.80 (0.032)
9.52 (3/8)	0.80 (0.032)
12.70 (1/2)	0.80 (0.032)
15.88 (5/8)	1.00 (0.039)
19.05 (3/4)	1.20 (0.047)

7.2. Pipe requirement

⚠ CAUTION

Refer to the Installation Manual of the outdoor unit for description of the length of connecting pipe or for difference of its elevation.

- Use pipe with water-resistant heat insulation.

⚠ CAUTION

Install heat insulation around both the gas and liquid pipes. Failure to do so may cause water leaks.
Use heat insulation with heat resistance above 248°F. (Reverse cycle model only)
In addition, if the humidity level at the installation location of the refrigerant piping is expected to exceed 70 %, install heat insulation around the refrigerant piping. If the expected humidity level is 70-80 %, use heat insulation that is 15mm(19/32 in.) or thicker and if the expected humidity exceeds 80 %, use heat insulation that is 20mm(25/32 in.) or thicker. If heat insulation is used that is not as thick as specified, condensation may form on the surface of the insulation. In addition, use heat insulation with heat conductivity of 0.045 W/(m·K) or less (at 68°F).

7.3. Flare connection (Pipe connection)

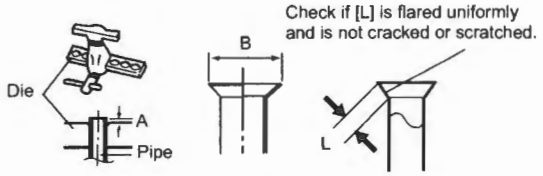
⚠ WARNING

Tighten the flare nuts with a torque wrench using the specified tightening method. Otherwise, the flare nuts could break after a prolonged period, causing refrigerant to leak and generate a hazardous gas if the refrigerant comes into contact with a flame.

7.3.1. Flaring

- Use special pipe cutter and flare tool exclusive for R410A.

(1) Cut the connection pipe to the necessary length with a pipe cutter.
(2) Hold the pipe downward so that cuttings will not enter the pipe and remove any burrs.
(3) Insert the flare nut (always use the flare nut attached to the indoor and outdoor units respectively) onto the pipe and perform the flare processing with a flare tool. Use the special R410A flare tool, or the conventional flare tool. Leakage of refrigerant may result if other flare nuts are used.
(4) Protect the pipes by pinching them or with tape to prevent dust, dirt, or water from entering the pipes.



Pipe outside diameter [mm (in.)]	Dimension A [mm (in.)] Flare tool for R410A, clutch type	Dimension B [mm (in.)]
6.35 (1/4)	0 to 0.5 (0 to 0.020)	9.1 (11/32)
9.52 (3/8)		13.2 (17/32)
12.70 (1/2)		16.6 (21/32)
15.88 (5/8)		19.7 (25/32)
19.05 (3/4)		24.0 (15/16)

When using conventional flare tools to flare R410A pipes, the dimension A should be approximately 0.5 mm (0.020 in.) more than indicated in the table (for flaring with R410A flare tools) to achieve the specified flaring. Use a thickness gauge to measure the dimension A.

Pipe outside diameter [mm (in.)]	Width across flats of Flare nut [mm (in.)]
6.35 (1/4)	17 (21/32)
9.52 (3/8)	22 (7/8)
12.70 (1/2)	26 (1-1/32)
15.88 (5/8)	29 (1-5/32)
19.05 (3/4)	36 (1-13/32)

7.3.2. Bending pipes

- If pipes are shaped by hand, be careful not to collapse them.
- Do not bend the pipes in an angle more than 90°.
- When pipes are repeatedly bend or stretched, the material will harden, making it difficult to bend or stretch them any more.
- Do not bend or stretch the pipes more than 3 times.

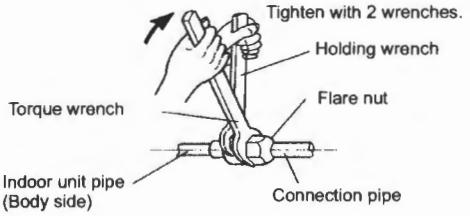
⚠ CAUTION
To prevent breaking of the pipe, avoid sharp bends.
If the pipe is bent repeatedly at the same place, it will break.

7.3.3. Pipe connection

⚠ CAUTION
Be sure to install the pipe against the port on the indoor unit correctly. If the centering is improper, the flare nut cannot tighten smoothly. If the flare nut is forced to turn, the threads will be damaged.
Do not remove the flare nut from the indoor unit pipe until immediately before connecting the connection pipe.
Hold the torque wrench at its grip, keeping it at a right angle with the pipe, in order to tighten the flare nut correctly.
Tighten the flare nuts with a torque wrench using the specified tightening method. Otherwise, the flare nuts could break after a prolonged period, causing refrigerant to leak and generate a hazardous gas if the refrigerant comes into contact with a flame.

⚠ CAUTION
Connect the piping so that the control box cover can easily be removed for servicing when necessary.
In order to prevent water from leaking into the control box, make sure that the piping is well insulated.

When the flare nut is tightened properly by your hand, hold the body side coupling with wrench, then tighten with a torque wrench. (See the table below for the flare nut tightening torques.)



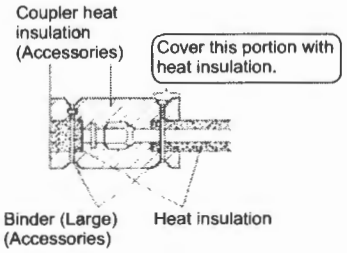
Flare nut [mm (in.)]	Tightening torque [N·m (lbf·ft)]
6.35 (1/4) dia.	16 to 18 (11.8 to 13.3)
9.52 (3/8) dia.	32 to 42 (23.6 to 31.0)
12.70 (1/2) dia.	49 to 61 (36.1 to 45.0)
15.88 (5/8) dia.	63 to 75 (46.5 to 55.3)
19.05 (3/4) dia.	90 to 110 (66.4 to 81.1)

7.4. Installing heat insulation

Install the heat insulation material after performing a refrigerant leak check (see the Installation Manual for the outdoor unit for details).

7.4.1. COUPLER HEAT INSULATION

- Insulate with the coupler heat insulation (Accessories) around the gas pipe and liquid pipe at indoor unit.
- After installing the coupler heat insulation, wrap both ends with vinyl tape so that there is no gap.
- After affixing the coupler heat insulation, secure it with 2 binders (large), one on each end of the insulation.
- Make sure that the binders overlap the heat insulation pipe.



⚠ CAUTION
After checking for gas leaks (refer to the Installation Manual of the outdoor unit), perform this section.
Install heat insulation around both the large (gas) and small (liquid) pipes. Failure to do so may cause water leaks.

8. INSTALLING DRAIN PIPES

8.1A. Installing drain pipes (Ceiling concealed type)

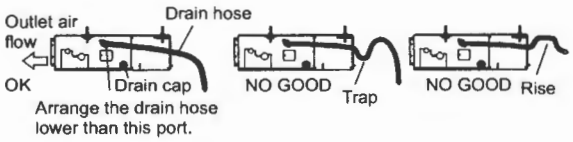
Use general hard polyvinyl chloride pipe and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
Always heat insulate the indoor side of the drain hose.
Use a drain pipe that matches the size of the drain hose (Table A).

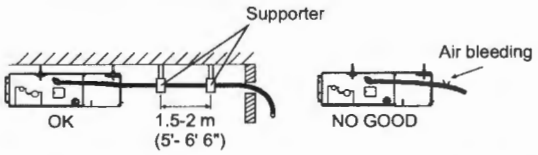
- Do not perform a rise, trap and air bleeding.
- Provide a downward gradient (1/100 or more).
- Provide supports when long pipes are installed.
- Use an insulation material as needed, to prevent the pipes from freezing.
- Install the pipes in a way that allows for the removal of the control box.

Table A

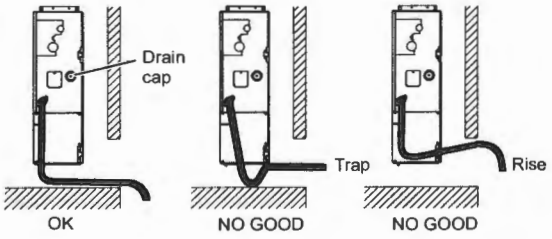
	Pipe Size
Drain pipe	3/4 in. (O.D. 1-1/16 in.)

- CEILING CONCEALED TYPE (Use Drain Pump)





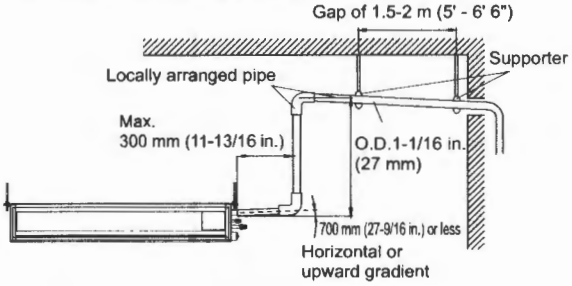
8.1B. Installing drain pipes (Wall mounted type/Floor standing concealed type)

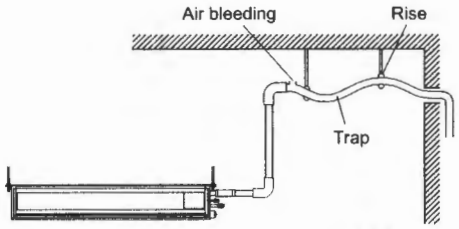


⚠ CAUTION

- Drain pump cannot be used if it is installed in wall mounted type/floor standing concealed type.
- Set "10.4.Jumper wire setting of Drainage function setting (JM1)".
- Be sure to connect the pipes for drainage without leakage.
- To avoid condensation and dripping, always insulate the indoor drain pipe.

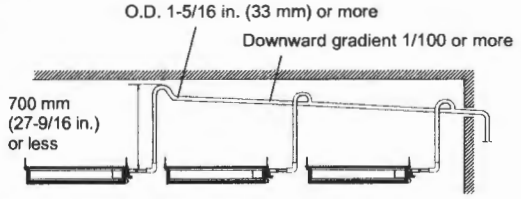
- Install the drain pipe with downward gradient (1/50 to 1/100) and so there are no rises or traps in the pipe.
- Use general hard polyvinyl chloride pipe [19 mm (3/4 in.) O.D. 27 mm (1-1/16 in.)] and connect it with adhesive (polyvinyl chloride) so that there is no leakage.
- When the pipe is long. Install supports.
- Do not perform air bleeding.
- Always heat insulate the indoor side of the drain pipe.





BAD

Observe the following procedures to construct centralized drain pipe fittings.



⚠ WARNING

Do not insert the drain piping into the sewer where sulfurous gas occurs. (Heat exchange erosion may occur)

Insulate the parts properly so that water will not drip from the connection parts.

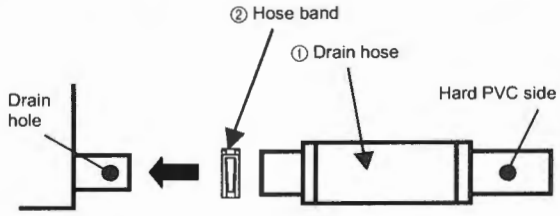
Check for proper drainage after the construction by using the visible portion of transparent drain port and the drain piping final outlet on the body.

⚠ CAUTION

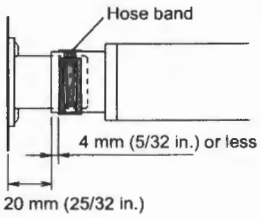
Do not apply adhesive agent on the drain port of the body. (Use the attached drain hose and connect the drain piping)

8.2. Install the drain pipe

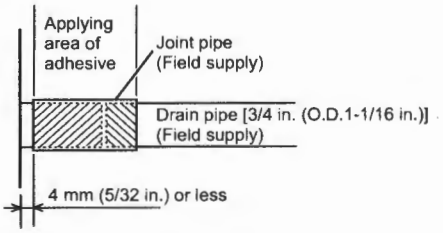
(1) Be sure to use supplied Drain hose ① and Hose band ②



• When drain pump is used. (Ceiling concealed type only)



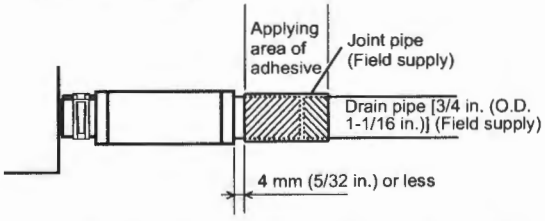
• When drain pump is not used. (Natural drainage)

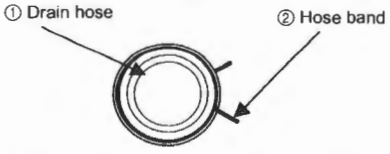


⚠ CAUTION

When drain pump is not used, do not connect the accessory drain hose and soft PVC hose directly.

(2) Be sure to insert Drain hose ① to the very end of the Drain pan of the unit with no space.





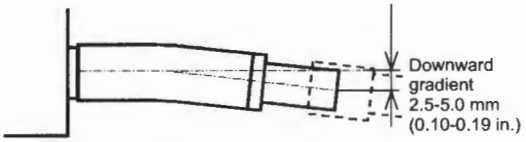
Fasten the Hose band ② at the position where vertical against ground.
The Hose band ② must be positioned at the right side of the Drain hose ① as in the figure.

⚠ CAUTION

Do not connect to the Drain hole with adhesive. Using adhesive may cause damage and water leaks.

(3) After installing the Drain hose ①, check if the drainage is smooth.

• When drain pump is not used. (Natural drainage)

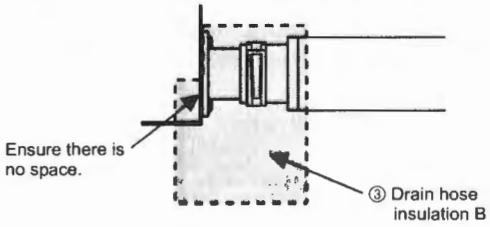


⚠ CAUTION

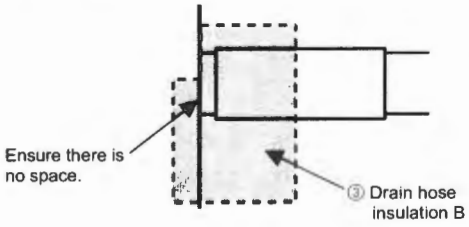
To prevent excessive force on Drain hose ①, avoid bends or twists. (To bend or twist may cause water leaks.)

(4) After checking for drainage, attach the Drain hose insulation B ③ to insulate, following the instructions as in the figures.
To avoid space with Drain hose ① and Hose band ②, press firmly the Drain hose insulation B ③.

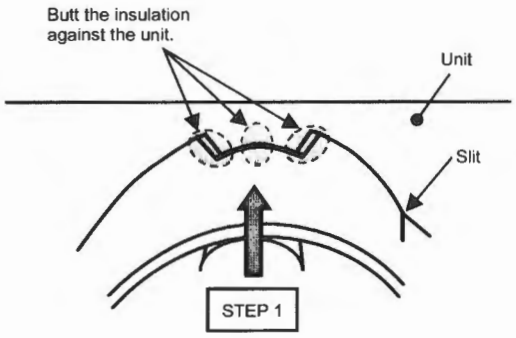
• When drain pump is used. (Ceiling concealed type only)

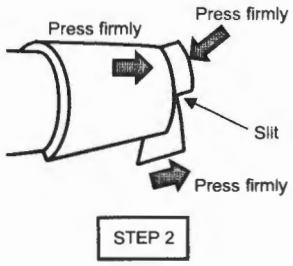


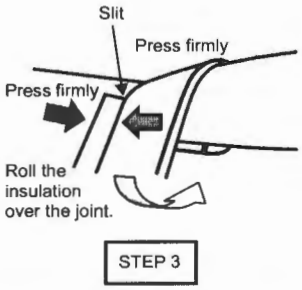
• When drain pump is not used. (Natural drainage)



• STEP1~STEP3

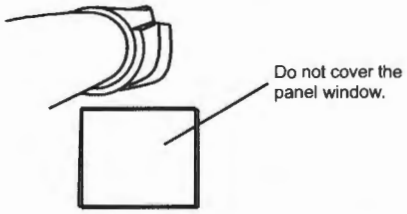




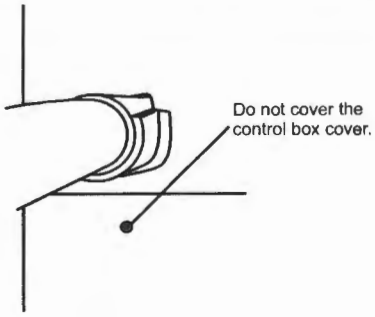


• FINISH
Check that there is no gap between the unit and the drain hose insulation.

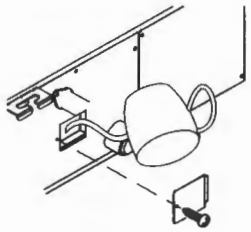
• When drain pump is used. (Ceiling concealed type only)



• When drain pump is not used. (Natural drainage)



Note: Check for drainage
Pour about 1 liter of water from the position shown in the diagram or from the airflow outlet to the condensate tray. Check for any abnormalities such as strange noises and whether the drain pump functions normally.

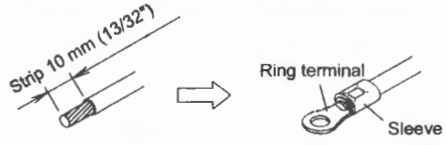


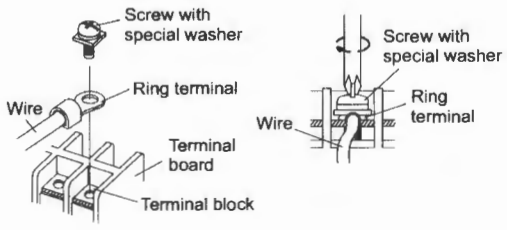
⚠ CAUTION
Make sure the drain water is properly drained.

9. ELECTRICAL WIRING

⚠ WARNING
Before starting work, check that power is not being supplied to the indoor unit and outdoor unit.
Match the terminal board numbers and connection cord colors with those of the outdoor unit or branch box. Erroneous wiring may cause burning of the electric parts.
Connect the connection cords firmly to the terminal board. Imperfect installation may cause a fire.
Always fasten the outside covering of the connection cord with the cable clip. (If the insulator is chafed, electric leakage may occur.)
Always connect the ground wire.

(1) Use ring terminals with insulating sleeves as shown in the figure below to connect to the terminal block.
(2) Securely clamp the ring terminals to the wires using an appropriate tool so that the wires do not come loose.
(3) Use the specified wires, connect them securely, and fasten them so that there is no stress placed on the terminals.
(4) Use an appropriate screwdriver to tighten the terminal screws. Do not use a screwdriver that is too small, otherwise, the screw heads may be damaged and prevent the screws from being properly tightened.
(5) Do not tighten the terminal screws too much, otherwise, the screws may break.
(6) See the table 1 for the terminal screw tightening torques.





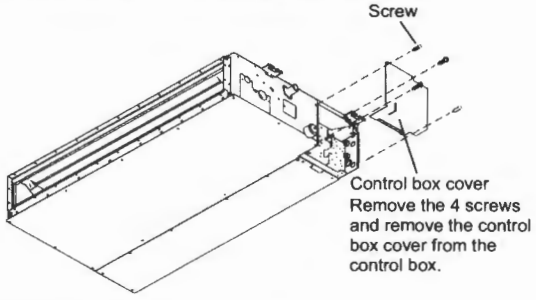
⚠ WARNING
Use ring terminals and tighten the terminal screws to the specified torques, otherwise, abnormal overheating may be produced and possibly cause heavy damage inside the unit.

Table 1

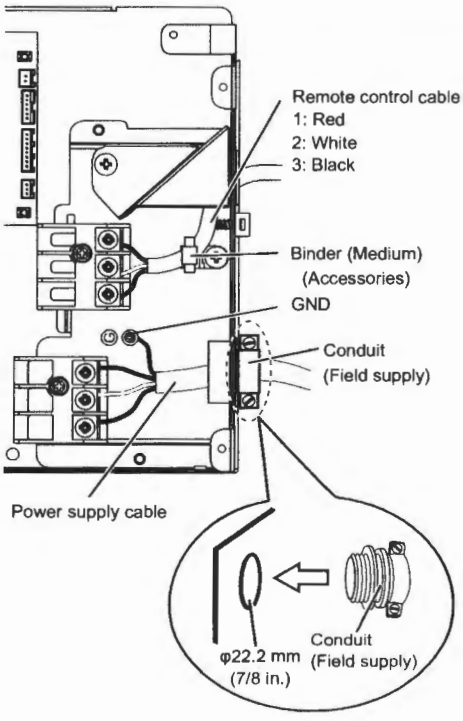
Tightening torque	
M4 screw	1.2 to 1.8 N·m (11 to 16 lbf·in)

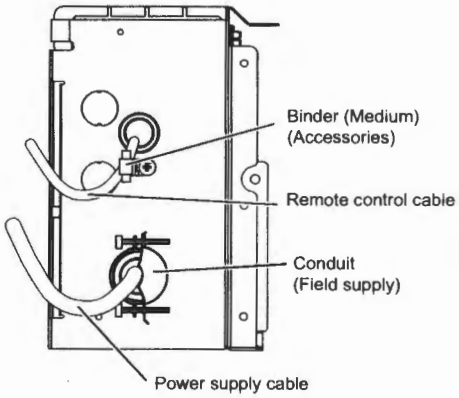
9.1. INDOOR UNIT SIDE

(1) Remove the control box cover from the control box.

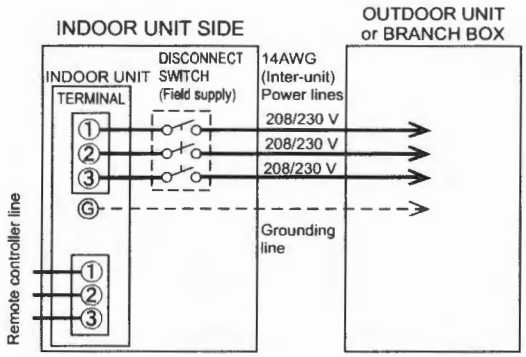


(2) Cable connection
- Connect the connection cable to the terminal board.
- Connect the remote controller cable to the terminal board.
- Fix the remote controller cable to the control box cover with a nylon clamp.





(3) Wiring system diagram



Disconnect Switch - Field supplied if required by local code.

Select the correct capacity of disconnect switch according to the load.

⚠ CAUTION
Tighten the indoor unit connection cable and power supply indoor and outdoor unit, branch box terminal board connections firmly with the terminal board screws. Faulty connection may cause a fire.
If the indoor unit connection cable and power supply are wired incorrectly, the air conditioner may be damaged.
Connect the indoor unit connection cable by matching the numbers of the outdoor, branch box and indoor units terminal board numbers as shown in terminal label.
Ground both the indoor and outdoor, branch box units by attaching a ground cable.
Unit shall be grounded in compliance with the applicable local and national rules.

⚠ WARNING
Disconnect switch for over current protection given in the system diagram is to be installed between the indoor unit and the outdoor unit, branch box.

⚠ CAUTION
Be sure to refer to the above diagram for do correct field wiring. Wrong wiring causes malfunction of the unit.
Check local electrical rules and also any specific wiring instructions or limitation.

10. REMOTE CONTROLLER SETTING

⚠ CAUTION

When detecting the room temperature using the remote controller, please set up the remote controller according to the following conditions. If the remote controller is not located properly, the correct room temperature will not be detected, and thus abnormal conditions like "not cooled" or "not heated" will occur even if the air-conditioner is running normally.

- **Locate where an average temperature for the room being air conditioned will be sensed.**
- **Do not locate directly exposed to the outlet air from the air-conditioner.**
- **Locate out of direct sunlight.**
- **Locate away from the influence of other heat sources.**

Do not touch the remote controller PC board and PC board parts directly with your hands.

Do not wire the remote controller cable together with or parallel to the connection cables, and power supply cable of the INDOOR UNIT and OUTDOOR UNIT, BRANCH BOX. It may cause erroneous operation.

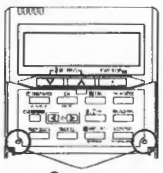
When installing the bus wire near a source of electromagnetic waves, use shielded wire.

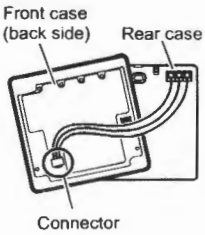
Do not set the DIP switches, either on the air conditioner or the remote controller, in any way other than indicated in this manual that is supplied with the air conditioner. Doing so may result in improper operation.

10.1. Installing the remote controller

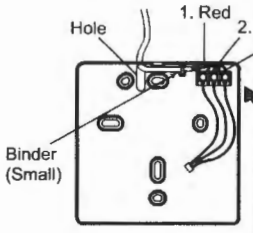
Open the operation panel on the front of the remote controller, remove the 2 screws indicated in the following figure, and then remove the front case of the remote controller.

When installing the remote controller, remove the connector from the front case. The wires may break if the connector is not removed and the front case hangs down.
When installing the front case, connect the connector to the front case.





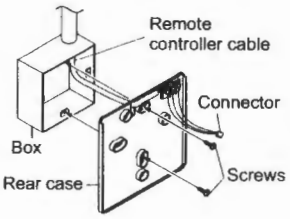
When remote controller cable is concealed
(1) Conceal the remote controller cable.
(2) Pass the remote controller cable through the hole in the rear case and connect the remote controller cable to the remote controller terminal board specified in figure.
(3) Clamp the remote controller cable sheath with the binder as shown in figure.
(4) Cut off the excess binder.
(5) Install the rear case to the wall, box, etc., with 2 screws figure.

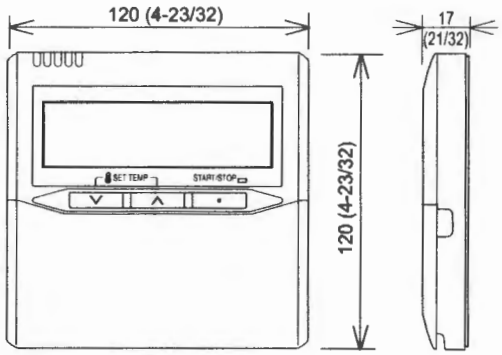


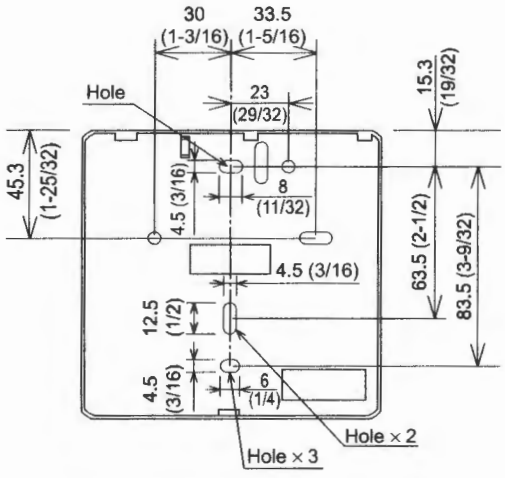
⚠ CAUTION

When connecting the remote controller wires, do not overtighten the screws.

[Example]







Unit: mm (in.)

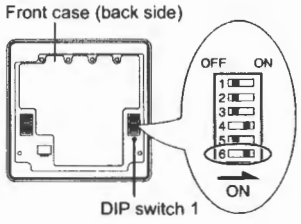
⚠ CAUTION

Install the remote controller wires so as not to be direct touched with your hand.

Do not touch the remote controller PC board and PC board parts directly with your hands.

10.2. Setting the dip switches

Set the remote controller DIP switches.
[Example]



	NO.	SW state		Detail
		OFF	ON	
DIP-switch 1	1	★		Cannot be used. (Do not change)
	2	★		Dual remote controller setting * Refer to 2. DUAL REMOTE CONTROLLERS in 11 SPECIAL INSTALLATION METHODS.
	3	★		Cannot be used. (Do not change)
	4		★	Cannot be used. (Do not change)
	5	★		Cannot be used. (Do not change)
	6	★ Invalidity	Validity	Memory backup setting * Set to ON to use batteries for the memory backup. If batteries are not used, all of the settings stored in memory will be deleted if there is a power failure.

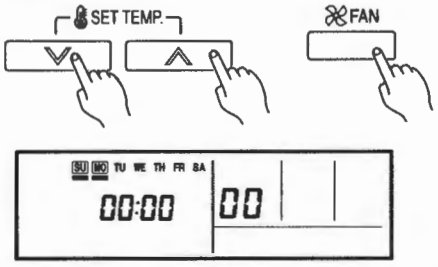
(★ Factory setting)

10.3. Function setting

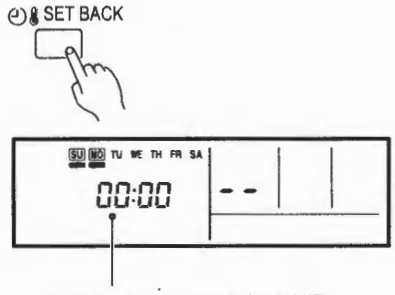
This procedure changes the function settings used to control the indoor unit according to the installation conditions. Incorrect settings can cause the indoor unit to malfunction. This procedure should be performed by authorized installation or service personnel only.

Perform the "FUNCTION SETTING" according to the installation conditions using the remote controller. (Refer to the indoor unit installation manual for details on the function numbers and setting values.)

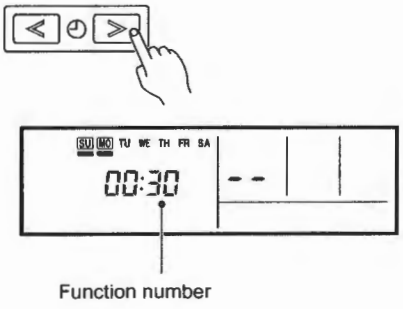
(1) Press the SET TEMP. buttons (∨) (∧) and FAN button simultaneously for more than 5 seconds to enter the function setting mode.



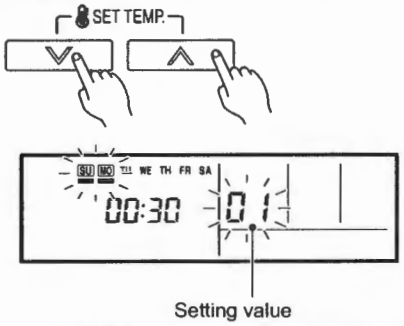
(2) Press the SET BACK button to select the indoor unit number.



(3) Press the SET TIME (< >) buttons to select the function number.



(4) Press the SET TEMP. buttons (∨) (∧) to select the setting value.
The display flashes as shown to the right during setting value selection.



Setting value

(5) Press the TIMER SET button to confirm the setting.
Press the TIMER SET button for a few seconds until the setting value stops flashing.
If the setting value display changes or if "- -" is displayed when the flashing stops, the setting value has not been set correctly.
(An invalid setting value may have been selected for the indoor unit.)

(6) Repeat steps 2 to 5 to perform additional settings.
Press the SET TEMP. buttons (∨) (∧) and FAN button simultaneously again for more than 5 seconds to cancel the function setting mode. In addition, the function setting mode will be automatically canceled after 1 minute if no operation is performed.

(7) After completing the FUNCTION SETTING, be sure to turn off the power and turn it on again.

• Function Details

(1) Filter Sign

The indoor unit has a sign to inform the user that it is time to clean the filter. Select the time setting for the filter sign display interval in the table below according to the amount of dust or debris in the room. If you do not wish the filter sign to be displayed, select the setting value for "No indication".

(♦... Factory setting)

Setting description	Function number	Setting value
Standard (400 hours)	11	00
Long interval (1000 hours)		01
Short interval (200 hours)		02
♦ No indication		03

(2) Static pressure

Select appropriate static pressure according to the installation conditions.

(♦... Factory setting)

Setting description	Function number	Setting value
0 in. WG (0 Pa)	26	00
0.04 in. WG (10 Pa)		01
0.08 in. WG (20 Pa)		02
0.12 in. WG (30 Pa)		03
0.16 in. WG (40 Pa)		04
0.20 in. WG (50 Pa)		05
0.24 in. WG (60 Pa)		06
0.28 in. WG (70 Pa)		07
0.32 in. WG (80 Pa)		08
0.36 in. WG (90 Pa)		09
♦ 0.1 in. WG (25 Pa) [Standard]		31

Range of static pressure is different from one model to other.

Model name	Range of static pressure
ARU9RLF	0 to 0.36 in. WG (0 to 90 Pa)
ARU12RLF	
ARU18RLF	
ARU24RLF	0 to 0.2 in. WG (0 to 50 Pa)

(3) Cooling room temperature correction

Depending on the installed environment, the room temperature sensor may require a correction.
The settings may be selected as shown in the table below.

(♦... Factory setting)

Setting description	Function number	Setting value
♦ Standard	30	00
Slightly lower control		01
Lower control		02
Warmer control		03

When using floor console installation, change the setting value to "01".

(4) Heating room temperature correction

Depending on the installed environment, the room temperature sensor may require a correction.
The settings may be changed as shown in the table below.

(♦... Factory setting)

Setting description	Function number	Setting value
♦ Standard	31	00
Lower control		01
Slightly warmer control		02
Warmer control		03

When using floor console installation, change the setting value to "01".

(5) Auto restart

Enable or disable automatic system restart after a power outage.

(♦... Factory setting)

Setting description	Function number	Setting value
♦ Yes	40	00
No		01

* Auto restart is an emergency function such as for power failure etc. Do not start and stop the indoor unit by this function in normal operation. Be sure to operate by the control unit, or external input device.

(6) Indoor room temperature sensor switching function

(Only for Wired remote controller)

The following settings are needed when using the Wired remote controller temperature sensor.

(♦... Factory setting)

Setting description	Function number	Setting value
♦ No	42	00
Yes		01

* If setting value is "00" :
  Room temperature is controlled by the indoor unit temperature sensor.
* If setting value is "01" :
  Room temperature is controlled by either indoor unit temperature sensor or remote controller unit sensor.

(7) Wireless remote controller signal code

Change the indoor unit Signal Code, depending on the wireless remote controllers.

(♦... Factory setting)

Setting description	Function number	Setting value
♦ A	44	00
B		01
C		02
D		03

(8) External input control

"Operation/Stop" mode or "Forced stop" mode can be selected.

(♦... Factory setting)

Setting description	Function number	Setting value
♦ Operation/Stop mode	46	00
(Setting forbidden)		01
Forced stop mode		02

Setting record

- Record any changes to the settings in the following table.

Setting	Setting Value
(1) Filter sign	
(2) Static pressure	
(3) Cooler room temperature correction	
(4) Heater room temperature correction	
(5) Auto restart	
(6) Indoor room temperature sensor switching function	
(7) Wireless remote controller signal code	
(8) External input control	

After completing the FUNCTION SETTING, be sure to turn off the power and turn it on again.

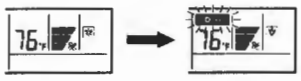
SETTING THE ROOM TEMPERATURE DETECTION LOCATION

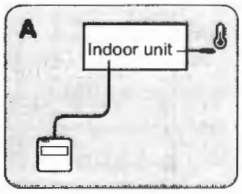
The detection location of the room temperature can be selected from the following 2 examples. Choose the detection location that is best for the installation location.

A. Indoor unit setting (factory setting)

The room temperature is detected by the indoor unit temperature sensor.

(1) When the THERMO SENSOR button is pressed, the lock display flashes because the function is locked at the factory.

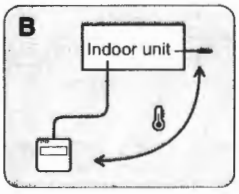




B. Indoor unit/remote controller setting (room temperature sensor selection)

The temperature sensor of the indoor unit or the remote controller can be used to detect the room temperature.

(1) Enable the room temperature sensor selection in FUNCTION SETTING, which will be previous page.
(2) Press the THERMO SENSOR button for 5 seconds or more to select the temperature sensor of the indoor unit or the remote controller.



NOTES

If the function to change the temperature sensor is used as shown in examples A (other than example B), be sure to lock the detection location. If the function is locked, the lock display will flash when the THERMO SENSOR button is pressed.

10.4. Jumper wire setting

(1) Drainage function setting (JM1)

If contained drain pump is not used, set the drainage function to "Invalid" in the drainage function switching.

- If contained drain pump is not use:
  When used under "WALL MOUNTED TYPE/FLOOR STANDING CONCEALED TYPE".
  When used in natural drainage under "CEILING CONCEALED TYPE".

(♦... Factory setting)

JM1	Drainage function
♦ Connect	Valid
Disconnect	Invalid

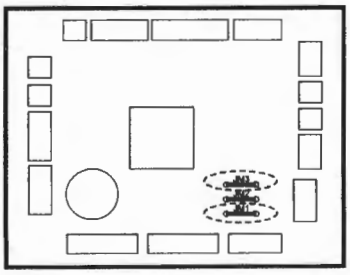
(2) Fan delay setting (JM3)

It is a function to delay the stop of cooling fan when the air conditioner is stopped.

(♦... Factory setting)

JM3	Fan delay
♦ Connect	Invalid
Disconnect	Valid

• Switching position



• JM2 setting forbidden

10.5. Test run

⚠ CAUTION

Always turn on the power 12 hours prior to the start of the operation in order to ensure compressor protection.

CHECK ITEMS

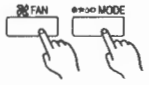
(1) Is operation of each button on the remote control unit normal?
(2) Does each lamp light normally?
(3) Do not air flow direction louvers operate normally?
(4) Is the drain normal?
(5) Is there any abnormal noise and vibration during operation?

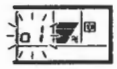
- Do not operate the air conditioner in test run for a long time.

[OPERATION METHOD]

- For the operation method, refer to the operating manual.

(1) Stop the air conditioner operation.
(2) Press the master control button and the fan control button simultaneously for 2 seconds or more to start the test run.





Test run display

(3) Press the start/stop button to stop the test run.

If "C0" appears in the unit number display, there is a remote controller error. Refer to the installation manual included with the remote controller.

Unit number	Error code	Content
C0	15	Incompatible indoor unit is connected
C0	12	Indoor unit ↔ remote controller communication error

[Using the wireless remote control for test run] (Option)

- For the operation method, refer to the operating manual.
- The outdoor unit may not operate depending on the room temperature. In this case, press the test run button on the wireless remote control unit while the air conditioner is running. (Point the transmitter section of the wireless remote control unit toward the air conditioner and press the test run button with the tip of a ball-point pen, etc.)

Transmitter section

Test run button

- To end test operation, press the wireless remote control unit START/STOP button.
  (When the air conditioner is run by pressing the test run button, the OPERATION indicator lamp and TIMER indicator lamp will simultaneously flash slowly.)

11. SPECIAL INSTALLATION METHODS

⚠ CAUTION

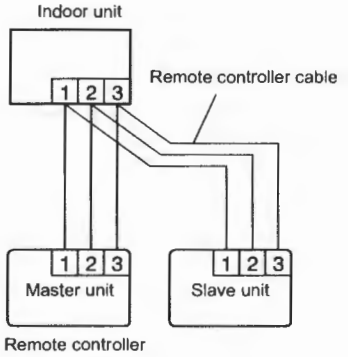
When setting DIP switches, do not touch any other parts on the circuit board directly with your bare hands.

Be sure to turn off the main power.

DUAL REMOTE CONTROLLERS

- 2 separate remote controllers can be used to operate the indoor units.
- The timer and self-diagnosis functions cannot be used on the slave units.

(1) Wiring method (indoor unit to remote controller)



(2) Remote controller DIP switch 1 setting
Set the remote controller DIP switch 1 No. 2 according to the following table.

Number of remote controllers	Master unit	Slave unit
	DIP SW 1 No. 2	DIP SW 1 No. 2
1 (Normal)	OFF	–
2 (Dual)	OFF	ON

12. OPTIONAL PARTS

⚠ WARNING

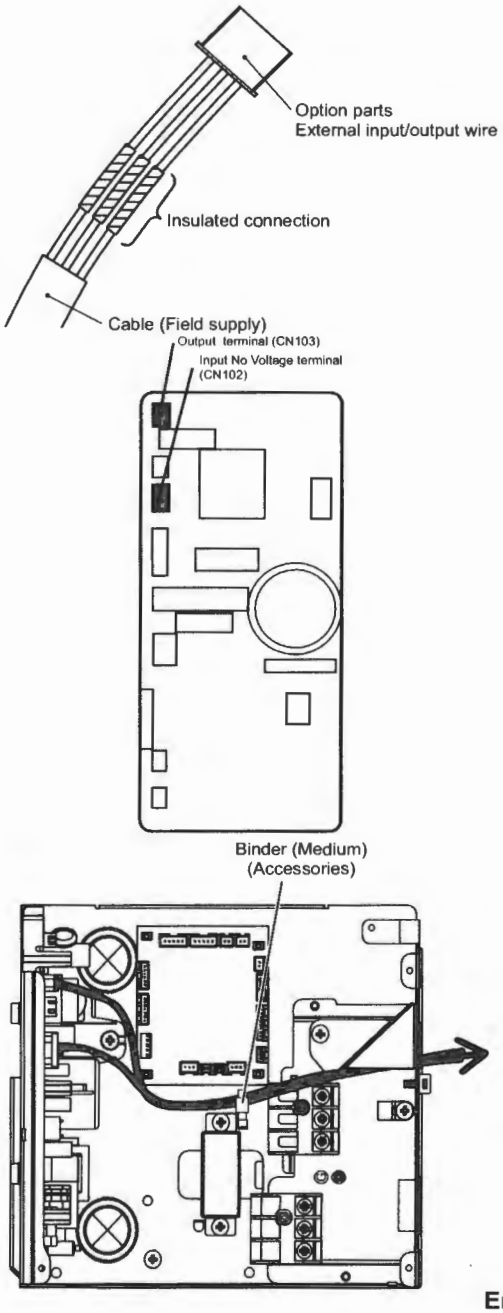
Refer to local codes for acceptable cable type.

12.1. External input and external output

Connection methods

- Wire modification

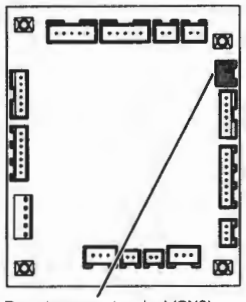
Remove insulation from wire attached to wire kit connector.
Remove insulation from field supplied cable.
Use crimp type insulated butt connector to join field cable and wire kit wire.



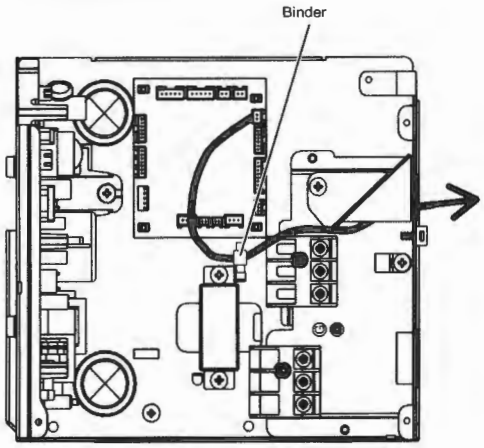
12.2. Remote sensor (Optional parts)

Connection method

- Connection terminals



- Wiring arrangement



- Remove the existing connector and replace it with the remote sensor connector (ensure that the correct connector is used).
- The original connector should be insulated to ensure that it does not come into contact with other electrical circuitry.

Setting for room temperature correction

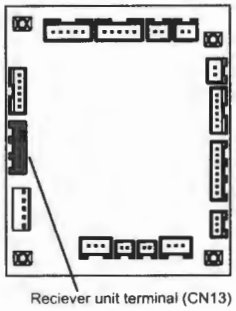
When a remote sensor is connected, set the function setting of indoor unit as indicated below.

- Set Function Number "30" (Cool air temperature trigger) to "00" (Default)
- Set Function Number "31" (Hot air temperature trigger) to "02" (Adjust(2))

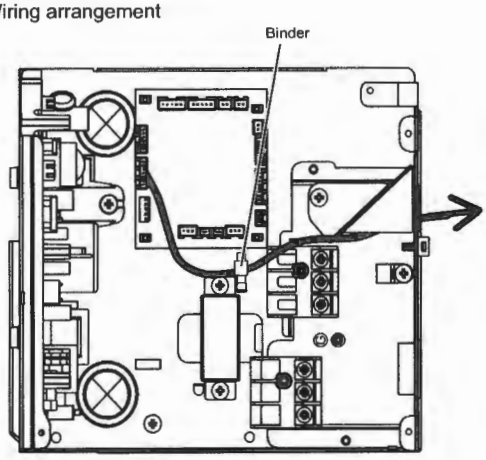
12.3. IR Receiver Unit (Optional parts)

Connection method

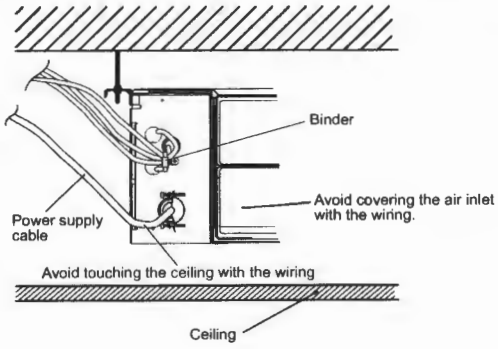
- Connection terminals



- Wiring arrangement



- Use 7 pins for receiver unit cable.
- At first, connect the receiver unit cable to the Receiver unit terminal (CN13).



Do not bind the power supply cable and other cables together.

13. ERROR CODES

If you use a wired type remote control, error codes will appear on the remote control display. If you use a wireless remote control, the lamps on the IR receiver unit will output error codes by way of blinking patterns. See the lamp blinking patterns and error codes in the table below. An error display is displayed only during operation.

Error display				Mode	DESCRIPTION	Remark
OPERATION lamp (green)	TIMER lamp (orange)	ECONOMY lamp (green)	Wired remote controller Error code			
● (1)	● (1)	◇	11	Communication	Serial communication error	•When the indoor unit cannot receive the signal from the branch unit •When the branch unit cannot receive the signal from the indoor unit
● (1)	● (2)	◇	12	Communication	Remote controller communication error	•Wired remote controller communication error
● (1)	● (5)	◇	15	Communication	Scan error	•Check operation incompletion error (normally, operation disabled)
● (2)	● (1)	◇	21	Function setting	Initial setting error	•Wiring mistake
● (2)	● (2)	◇	22	Function setting	Indoor unit capacity error	•Indoor unit capacity error
● (2)	● (3)	◇	23	Function setting	Connection disabled (series error)	•Combination error
● (2)	● (4)	◇	24	Function setting	Connection unit number error	•Connection unit number error (indoor unit) •Connection unit number error (branch unit)
● (3)	● (2)	◇	32	Indoor unit	Indoor unit main PCB error	•Indoor unit PCB Model information error
● (3)	● (5)	◇	35	Indoor unit	Manual auto switch error	•Manual auto switch error
● (4)	● (1)	◇	41	Indoor unit	Room error	•Inlet thermistor error
● (4)	● (2)	◇	42	Indoor unit	Indoor unit Heat Ex. sensor error	•Indoor unit Heat Ex. Middle thermistor error
● (5)	● (1)	◇	51	Indoor unit	Indoor unit fan motor error	•Main fan motor lock error •Main fan motor revolution speed error
● (5)	● (3)	◇	53	Indoor unit	Water Drain error	•Drain pump error
● (5)	● (15)	◇	5U	Indoor unit	Indoor unit error	•Indoor unit error
● (6)	● (2)	◇	62	Outdoor unit	Outdoor unit main PCB error	•Outdoor unit PCB Model information error •Outdoor unit PCB microcomputer communication error
● (6)	● (3)	◇	63	Outdoor unit	Inverter PCB error	•Inverter error
● (6)	● (4)	◇	64	Outdoor unit	Active filter error, PFC circuit error	•Voltage error stoppage permanently •Voltage error (can restore) •Over current protected operation stoppage permanently •PFC hardware error
● (6)	● (5)	◇	65	Outdoor unit	IPM error	•Trip terminal L error
● (6)	● (10)	◇	6A	Outdoor unit	Display panel error	•Microcomputers communication error
● (7)	● (1)	◇	71	Outdoor unit	Discharge thermistor error	•Discharge thermistor 1 error
● (7)	● (2)	◇	72	Outdoor unit	Compressor thermistor error	•Compressor thermistor 1 error
● (7)	● (3)	◇	73	Outdoor unit	Outdoor unit Heat Ex. Sensor error	•Outdoor unit Heat Ex. liquid thermistor error
● (7)	● (4)	◇	74	Outdoor unit	Outdoor thermistor error	•Outdoor thermistor error
● (7)	● (5)	◇	75	Outdoor unit	Suction Gas thermistor error	•Suction Gas thermistor error
● (7)	● (7)	◇	77	Outdoor unit	Heat sink thermistor error	•Heat sink thermistor error
● (8)	● (2)	◇	82	Outdoor unit	Sub-cool Heat Ex. gas thermistor error	•Sub-cool Heat Ex. gas inlet thermistor error •Sub-cool Heat Ex. gas outlet thermistor error
● (8)	● (3)	◇	83	Outdoor unit	Liquid pipe thermistor error	•Liquid pipe thermistor 1 error
● (8)	● (4)	◇	84	Outdoor unit	Current sensor error	•Current sensor 1 error (stoppage permanently)
● (8)	● (6)	◇	86	Outdoor unit	Pressure sensor error	•Discharge pressure sensor error •Suction pressure sensor error •High pressure switch 1 error
● (9)	● (4)	◇	94	Outdoor unit	Trip detection	•Trip detection
● (9)	● (5)	◇	95	Outdoor unit	compressor motor control error	•Rotor position detection error (stoppage permanently)
● (9)	● (7)	◇	97	Outdoor unit	Outdoor unit fan motor 1 error	•Duty error
● (9)	● (9)	◇	99	Outdoor unit	4-way valve error	•4-way valve error
● (10)	● (1)	◇	A1	Refrigerant system	Discharge temperature 1 error	•Discharge temperature 1 error
● (10)	● (3)	◇	A3	Refrigerant system	Compressor temperature error	•Compressor 1 temperature error
● (10)	● (5)	◇	A5	Refrigerant system	Pressure error 2	•Low pressure error
● (13)	● (2)	◇	J2	Branch box	Unit flow divider error	•EEPROM access error •Equipment type information error •Serial communication error to outdoor unit •Branch units serial communication error •Serial communication error to indoor unit •Liquid pipe thermistor error •Gas pipe thermistor error •Expansion valve full closure operation error •Remote control communication error •Branch unit error

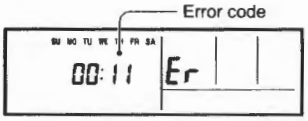
•Display mode ● : 0.5s ON / 0.5s OFF, ( ) : Number of flashing, ◇ : 0.1s ON / 0.1s OFF

[Troubleshooting at the remote control LCD]

This is possible only on the wired remote control.

[Self-diagnosis]

If an error occurs, the following display will be shown.
("Er" will appear in the set room temperature display.)



EX. Self-diagnosis

14. CUSTOMER GUIDANCE

Explain the following to the customer in accordance with the operating manual:

(1) Starting and stopping method, operation switching, temperature adjustment, timer, air flow switching, and other remote control unit operations.
(2) Air filter removal and cleaning, and how to use the air louvers.
(3) Give the operating manual to the customer.
(4) If the wireless remote control signal code is changed from A to B, C, or D, it will change back to A when the batteries in the remote are replaced. Explain to the customer how to program the wireless remote for the correct signal code.