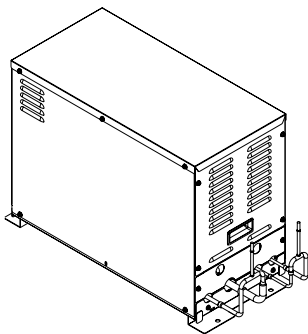


**DAIKIN**

# INSTALLATION MANUAL

## Booster Unit



**Booster Unit  
(LCBKQ3AV1(E))**

**Installation manual  
Booster Unit**

English

**Installationsanleitung  
Zusatzgerät**

Deutsch

**Manuel d'installation  
Unité d'accélération**

Français

**Manual de instalación  
Unidad booster**

Español

**Manuale di installazione  
Compressore ausiliario**

Italiano

**Installatiehandleiding  
Boostereenheid**

Nederlands

**Manual de instalação  
Booster**

Portugues

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CE - IZJAVA-O-USKLADENOSTI  
 CE - MEGFELELŐSEGHNYILATKOZAT  
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 LCBK03AV1(E)(R)

- 01 are in conformity with the following standard(s) or other normative document(s), provided that these are used in accordance with our instructions;
- 02 der/den folgenden Norm(en) oder einem anderen Normdokument oder -dokumenten entspricht/entsprechen, unter der Voraussetzung, daß sie gemäß unseren Anweisungen eingesetzt werden;
- 03 sont conformés à la/s norme(s) ou autre(s) document(s) normatif(s), pour autant qu'ils soient utilisés conformément à nos instructions;
- 04 conforma de volgende norm(en) of één of meer andere technische documenten zijn, op voorwaarde dat ze worden gebruikt overeenkomstig onze instructies;
- 05 están en conformidad con la/s siguiente(s) norma(s) u otro(s) documento(s) normativo(s), siempre que sean utilizados de acuerdo con nuestras instrucciones;
- 06 sono conformi all(i) seguente(i) standard(i) o altro(i) documento(i) a carattere normativo, a patto che vengano usati in conformità alle nostre istruzioni;
- 07 sono conformi alle (i) seguenti norme (i) o altri (i) documenti (i) di tipo normativo, a patto che vengano usati in conformità alle istruzioni;
- 08 в соответствии с положениями Директивы 90/269/EEC и/или других нормативных документов, при условии, что они используются в соответствии с нашими инструкциями;

**EN60335-2-40, EN60335-2-89**

- 01 following the provisions of:
- 02 gemäß den Vorschriften der:
- 03 conformément aux stipulations des:
- 04 overeenkomstig de bepalingen van:
- 05 siguiendo las disposiciones de:
- 06 secondo le prescrizioni per:
- 07 de tipo de acordo com o previsto em:
- 08 в соответствии с положениями:
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- 01 " as set out in <A> and judged positively by <B> according to the Certificate <C>.
- 02 " wie in der <A> aufgeführt und von <B> positiv beurteilt gemäß Zertifikat <C>.
- 03 " tel que défini dans <A> et évalué positivement par <B> conformément au Certificat <C>.
- 04 " zoals vermeld in <A> en positief beoordeeld door <B> overeenkomstig Zertificaat <C>.
- 05 " como se establece en <A> y es valorado positivamente por <B> de acuerdo con el Certificado <C>.
- 06 " delineato nel <A> e giudicato positivamente da <B> secondo il Certificato <C>.
- 07 " όπως καθορίστηκε στο <A> και κρίθηκε θετικά από το <B> σύμφωνα με το Πρωτόκολλο <C>.
- 08 " tal como estabelecido em <A> e com o parecer positivo de <B> de acordo com o Certificado <C>.
- 09 " как указано в <A> и в соответствии с положительным решением <B> согласно Сертификату <C>.
- 10 " som anført i <A> og positivt vurderet af <B> i henhold til Certificat <C>.

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- 08 estão em conformidade com a(s) seguinte(s) norma(s) ou outro(s) documento(s) normativo(s), desde que estes sejam utilizados de acordo com as nossas instruções;
- 09 соответствуют следующим стандартам или другим нормативным документам, при условии их использования согласно нашим инструкциям;
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- 13 vastavien seuraavien standardien ja muiden ohjeistettujen dokumenttien vaatimuksia edellyttäen, että niitä käytetään ohjeistamme mukaisesti;
- 14 za predpostavku, že jsou využívány v souladu s našimi pokyny, odpovídají následujícími normám nebo normativním dokumentům;
- 15 in skladu sa siljeodnim standardom(i) ili drugim normativnim dokumentom(i)ma, uz uvjet da se oni koriste u skladu s našim uputama;

- 16 " alzi <A> alapján, alzi <B> igazolta a megjelölt, alzi <C> tanúsítvány szerint.
- 17 " zgodnie z dokumentacją <A>, pozytywną opinią <B> i Świadectwem <C>.
- 18 " sau cum este stabilit în <A> și apreciat pozitiv de <B> în conformitate cu Certificatul <C>.
- 19 " jer je odobreno v <A> in odobeno s strani <B> v skladu s certifikatom <C>.
- 20 " naci on navedeni dokumenti <A> ja nehas kade <B> jarg vestrali dokaz deglatindigi ghi.

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- 18 overvörder følgende standard(er) eller andre tekniske dokument(er), forudsat at disse anvendes i henhold til vores instruktioner;
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- 20 (E) erklärt auf seine alleinige Verantwortung daß die Modelle der Klimaanlage für die diese Erklärung bestimmt ist;
- 21 (F) déclare sous sa seule responsabilité que les appareils d'air conditionné visés par la présente déclaration;
- 22 (NL) verklaart hierbij op eigen exclusieve verantwoordelijkheid dat de airconditioning units waarop deze verklaring betrekking heeft;
- 23 (E) declara bajo su única responsabilidad que los modelos de aire acondicionado a los cuales hace referencia la declaración;
- 24 (B) δηλώνει υπό την αποκλειστική του ευθύνη ότι τα μοντέλα των κλιματιστικών συσκευών στα οποία αναφέρεται η παρούσα δήλωση;
- 25 (B) δηλώνει με αποκλειστική της ευθύνη ότι τα μοντέλα των κλιματιστικών συσκευών στα οποία αναφέρεται η παρούσα δήλωση;
- 26 (P) declara sob sua exclusiva responsabilidade que os modelos de ar condicionado a que esta declaração se refere;
- 27 (B) заявляет, исключительно под своею ответственности, что модели кондиционеров названы в заявлении;

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## 1. FIRST OF ALL


- This document is an installation manual for the Daikin Booster Unit. Before installing the unit, read this manual thoroughly, and following the instructions contained in it. After installation, do a test run to make sure the unit runs properly, and then explain how to operate and take care of the unit to the customer, using the operation manual.
- Lastly, make sure the customer keeps this manual, along with the operation manual, in a safe place.
- This manual does not describe how to install the indoor unit and outdoor unit.  
Refer to the installation manual included with the indoor unit and outdoor unit for that.


### 1-1 Safety Precautions


Please read these "Safety precautions" carefully before installing the booster unit and be sure to install it correctly.

After completing installation, conduct a trial operation to check for faults and explain to the customer how to operate the booster unit and take care of it with the aid of the operation manual. Ask the customer to store the installation manual along with the operation manual for future reference.


Meaning of WARNING and CAUTION notices


 **WARNING**..... Failure to follow these instructions properly may result in personal injury or loss of life.

 **CAUTION**..... Failure to observe these instructions properly may result in property damage or personal injury, which may be serious depending on the circumstances.

 **WARNING**

- Ask your dealer or qualified personnel to carry out installation work.  
Do not attempt to install the booster unit yourself. Improper installation may result in water leakage, electric shocks or fire.

- Maintenance personnel of the manufacturer or equivalent skilled personnel should install this unit.
- Install the booster unit in accordance with the instructions in this installation manual.  
Improper installation may result in water leakage, electric shocks or fire.
- When installing the unit in a small room, take measures against to keep refrigerant concentration from exceeding allowable safety limits in the event of refrigerant leakage.  
Contact the place of purchase for more information. Excessive refrigerant in a closed ambient can lead to oxygen deficiency.
- Be sure to use only the specified accessories and parts for installation work.  
Failure to use the specified parts may result in the unit falling, water leakage, electric shocks or fire.
- Install the booster unit on a foundation strong enough to withstand the weight of the unit.  
A foundation of insufficient strength may result in the equipment falling and causing injury.
- Carry out the specified installation work after taking into account strong winds, typhoons or earthquakes.  
Failure to do so during installation work may result in the unit falling and causing accidents.
- Make sure that a separate power supply circuit is provided for this unit and that all electrical work is carried out by qualified personnel according to local laws and regulations and this installation manual.  
An insufficient power supply capacity or improper electrical construction may lead to electric shocks or fire.
- Make sure that all wiring is secured, the specified wires are used, and that there is no strain on the terminal connections or wires.  
Improper connections or securing of wires may result in abnormal heat build-up or fire.
- When wiring the power supply and connecting transmission wiring, position the wires so that the control box lid can be securely fastened.  
Improper positioning of the control box lid may result in electric shocks, fire or the terminals overheating.
- If refrigerant gas leaks during installation, ventilate the area immediately.  
Toxic gas may be produced if the refrigerant gas comes into contact with fire.
- After completing installation, check for refrigerant gas leakage.  
Toxic gas may be produced if the refrigerant gas leaks into the room and comes into contact with a source of fire, such as a fan heater, stove or cooker.
- Be sure to switch off the unit before touching any electrical parts.
- Do not directly touch refrigerant that has leaked from refrigerant pipes or other areas, as there is a danger of frostbite.
- Do not allow children to climb on the outside unit and avoid placing objects on the unit.  
Injury may result if the unit becomes loose and falls.
- Be sure to earth the booster unit.  
Do not earth the unit to a utility pipe, lightning conductor or telephone earth lead. Imperfect earthing may result in electric shocks or fire.  
  
A high surge current from lightning or other sources may cause damage to the booster unit.
- Be sure to install an earth leakage breaker.  
Failure to install an earth leakage breaker may result in electric shocks or fire.

 **CAUTION**

- While following the instructions in this installation manual, install drain piping to ensure proper drainage and insulate piping to prevent condensation.  
Improper drain piping may result in indoor water leakage and property damage.

- Install the indoor and outdoor units, power cord and connecting wires at least 1 meter away from televisions or radios to prevent picture interference and noise.  
(Depending on the incoming signal strength, a distance of 1 meter may not be sufficient to eliminate noise.)
- Do not install the booster unit in the following locations:
  1. Where there is a high concentration of mineral oil spray or vapour (e.g. a kitchen).  
Plastic parts will deteriorate, parts may fall off and water leakage could result.
  2. Where corrosive gas, such as sulphurous acid gas, is produced.  
Corroding of copper pipes or soldered parts may result in refrigerant leakage.
  3. Near machinery emitting electromagnetic radiation.  
Electromagnetic radiation may disturb the operation of the control system and result in a malfunction of the unit.
  4. Where flammable gas may leak, where there is carbon fiber or ignitable dust suspensions in the air, or where volatile flammables such as paint thinner or gasoline are handled.  
Operating the unit in such conditions may result in fire.
  5. Vehicles, ships, or other places that generate vibration or cause the booster unit to move.  
The booster unit may malfunction or cause oxygen deficiency accidents as a result of refrigerant leakage.
  6. Places with excessive voltage fluctuations.  
The booster unit may malfunction.
  7. Places where fallen leaves accumulate or weeds grow thick.
  8. Places that become small animals' shelter.  
Small animals coming in contact with electrical parts can cause malfunctions, smoke, or ignition.
- The booster unit is not intended for use in a potentially explosive atmosphere.

## 1-2 Special Notice of Product

This booster unit comes under the term “appliances not accessible to the general public”.

### [CLASSIFICATION]

- This booster unit comes under the term “appliances not accessible to the general public”.
- Follow the showcase to be connected for the climate class.

### [EMC CHARACTERISTICS]

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

### [REFRIGERANT]

#### Important information regarding the refrigerant used

This product is factory charged with N2.

The refrigerant system will be charged with fluorinated greenhouse gases covered by the Kyoto Protocol. Do not vent gases into the atmosphere.

Refrigerant type : R410A

GWP<sup>(1)</sup> value : 1975

<sup>(1)</sup> GWP = global warming potential

\* Values are indicated in F-gas regulations (EC) No.842/2006, Annex I, Parts 1 and 2.

- The refrigerant R410A requires strict cautions for keeping the system clean, dry and tight.  
Read the chapter “REFRIGERANT PIPING” carefully and follow these procedures correctly.
  - A.Clean and dry  
Foreign materials (including mineral oils such as SUNISO oil or moisture) should be prevented from getting mixed into the system.
  - B.Tight  
Take care to keep the system tight when installing.  
R410A does not contain any chlorine, does not destroy the ozone layer, and does not reduce the earth's protection against harmful ultraviolet radiation.  
R410A can contribute slightly to the greenhouse effect if it is released.
- Since R410A is a mixed refrigerant, the required additional refrigerant must be charged in its liquid state. If the refrigerant is charged in a state of gas, its composition changes and the system will not work properly.

### [DESIGN PRESSURE]

Since design pressure is 3.8MPa or 38bar (for R407C units : 3.3MPa or 33bar), the wall thickness of pipes should be more carefully selected in accordance with the relevant local and national regulations.

## 1-3 Disposal Requirements

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

## 2. BEFORE INSTALLATION

### ⚠ CAUTION



- When installing the indoor unit and the outdoor unit, refer to the installation manual provided for the indoor unit and the outdoor unit.
- Optional accessories are required for the installation of the product. Refer to the information on optional accessory.



### 2-1 Standard Supplied Accessories

The following accessories are included. The storage location of the accessories is shown in the figure.

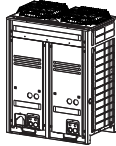
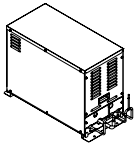
#### Note


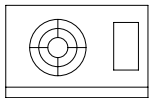

Do not throw away any of the accessories until installation is complete.

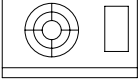
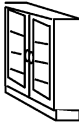



| Name     | Clamp  | Manual              | Drain socket   |
|----------|--|---------------------|--|
| Quantity | 3 pcs.   | 1 pc.               | 1 pc.  |
| Shape    |  | Installation Manual |  |

| Name     | Drain receiver  | Hole cap  |
|----------|---|---|
| Quantity | 1 pc.   | 4 pcs.  |
| Shape    |  |  |

### 2-2 Example of System Configuration

| Name  | Outdoor unit  | Booster unit  |
|-------|---|---|
| Shape |  |  |

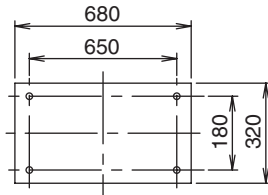
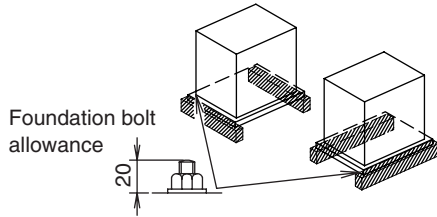
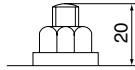
| Name  | Indoor unit  |   |   |
|-------|--|---|---|
|       | Air-conditioner  | Refrigeration   |   |
|       |  | Blower coil   | Showcase  |
| Shape |  |  |  |

| Name  | Indoor unit  |   | Control panel (Defrost)   | Warning panel   | Remote controller (for air-conditioner)   |
|-------|--|---|---|---|---|
|       | Freezer  |   |   |   |   |
|       | Blower coil  | Showcase  |   |   |   |
| Shape |  |  |  |  |  |



## 4-2 Installation the Unit

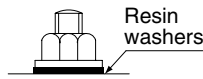
- Make sure the unit is installed level on a sufficiently strong base to prevent vibration and noise.
- Secure the unit to its base using foundation bolts. (Use four commercially available M8-type foundation bolts, nuts, and washers.)
- The foundation bolts should be inserted 20 mm.



Dimension of booster unit and foundation bolt position  
(Unit: mm)

### Note

- When installing on a roof, make sure the roof floor is strong enough and be sure to water-proof all work.
- Make sure the area around the machine drains properly by setting up drainage grooves around the foundation. Drain water is sometimes discharged from the booster unit when it is running.
- If the booster unit is of brine damage resistant type, use nuts provided with resin washers to secure the product to the foundation bolts (see the illustration on the right-hand side). The rustproof effect of the nut will be lost if the coatings on the tightening portions of the nuts come off.
- Use the drain pan kit when using indoors.  
<Model> BWC63A2  
Ensure that sufficient drainage is supplied by following the guidelines below as necessary when using outdoors.

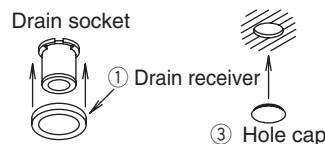
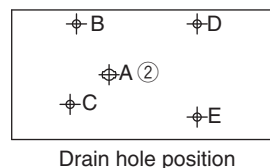


## 4-3 Draining the Unit

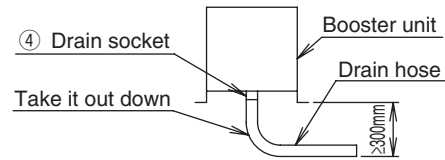
- For drainage work of the unit, install piping to ensure complete drainage.
- Condensation may form on the bottom frame depending on the condition of the installation location. If the unit is installed in a poorly drained location, install an additional drain pan (optional accessory).
- Check drainage of the drain pan after completing the installation work and make sure that the water runs smoothly.

## 4-4 Installation Procedure

1. Fit the drain holder to the top of the drain socket prong.
2. Fit the drain socket in drain hole-A of the bottom frame of the unit and turn it about 40 degrees clockwise.
3. Plug hole caps in other drain holes (B-E) from the underside to prevent water from leaking.
4. Connect the hose to the drain socket using a commercial plastic hose (I.D. 25 mm) and a hose band.



If the hose is long and hangs, be careful not to bend it halfway through.



If installing a drain hose directly to the booster unit, reserve the space described above.

## 5. REFRIGERANT PIPING

### To Piping Work Contractors

- Do not use flux at the time of brazing and connecting refrigerant pipes. Use phosphorous copper brazing filler metal (BCuP-2), which does not require flux. Chlorine-based flux causes piping corrosion. Furthermore, if fluoride is contained, the flux will have adverse influences on the refrigerant piping line, such as the deterioration of refrigerating machine oil.

### CAUTION

- All field piping must be installed by a licensed refrigeration technician and must comply with relevant local and national regulations.

### [Precautions for reuse of existing refrigerant piping / heat exchangers]

Keep the following points in mind for the reuse of existing refrigerant piping / heat exchangers.

A malfunction may result if there is deficiency.

- Do not use the existing piping in the following cases. Perform new piping instead.
  - The piping is different in size.
  - The strength of the piping is insufficient.
  - The compressor of the booster unit previously used caused a malfunction.  
An adverse influence of residual substances, such as the oxidation of refrigerant oil and the generation of scale, is considered.
  - If the indoor unit or outdoor unit is disconnected from the piping for a long time.  
The intrusion of water and dust into the piping is considered.
  - The copper pipe is corroded.
  - The refrigerant of the booster unit previously used was other than R410A (e.g., R404A / R507 or R407C).  
The contamination of the refrigerant with heterogeneity is considered.
- If there are welded connections midway on the local piping, make gas leakage checks on the welded connections.
- Be sure to insulate the connection piping.  
The liquid and gas pipe temperatures are as follows:  
Liquid pipe arrival minimum temperature:  
5°C (For outdoor unit)  
-10°C (To indoor unit)  
Gas pipe arrival minimum temperature:  
-45°C (For indoor unit)  
100°C (To outdoor unit) (Max. temperature)  
In the case of thickness insufficiency, add additional insulation material or renew the existing insulation material.
- Renew the insulation material if the insulation material is degraded.

Keep the following points in mind for the reuse of existing heat exchangers

- Units with insufficient design pressure (since this product is an R410A unit) require a lower-stage design pressure of 2.5 MPa [25 bars].
- Units for which the path to the heat exchanger has been routed so that the flow of refrigerant is from bottom to top
- Units with copper tubing or fan corrosion
- Units that may be contaminated with foreign matter such as rubbish or other dirt

## 5-1 Selection of Piping Material

- Make sure that the inner side and outer side of the piping used is clean and free of contaminants, such as sulphur, oxide, dust, chips, oil and fat, and water. It is desirable that the maximum oil adhesion in the piping is 30 mg per 10 m.
- Use the following type of refrigerant piping.  
Material: Seamless phosphorus deoxidized copper tube (C1220T-O for a maximum outer diameter of 15.9 mm and C1220T-1/2H for a minimum outer diameter of 19.1 mm)  
Refrigerant piping size and wall thickness: Decide the size and thickness from the following table.  
**(This product uses R410A. The withstand pressure of O type may be insufficient if it is used for piping with a minimum diameter of 19.1 mm. Therefore, be sure to use 1/2 H type with a minimum thickness of 1.0 mm.**  
**If O type is used for piping with a minimum diameter of 19.1 mm, a minimum thickness of 1.2 mm will be required. In that case, be sure to perform the blazing of each joint.)**
- Be sure to perform piping work within the range specified in the following table.

### <Refrigerant piping size>

| Piping size (O. D. × min. thickness)(mm) |   |
|--|---|
| LCBKQ3AV1(E)                             | Liquid piping inlet, outlet (Note 1) (Note 2) |
|  | Suction piping (Note 1) (Note 2)              |
|  | Discharge piping (Note 1)                     |

(Note 1)

Liquid piping inlet (Main liquid piping between booster unit and outdoor unit)

Liquid piping outlet (Between booster unit and refrigeration showcase)

Suction piping (Between booster unit and refrigeration showcase)

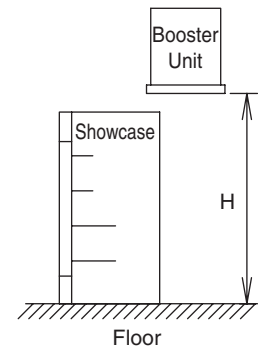
Discharge piping (Main gas piping between booster unit and outdoor unit) (Note 2)

If the size of the connection pipe of the refrigerating showcase exceeds that of the branch pipe shown in the table on the left, install piping near the refrigerating showcase.

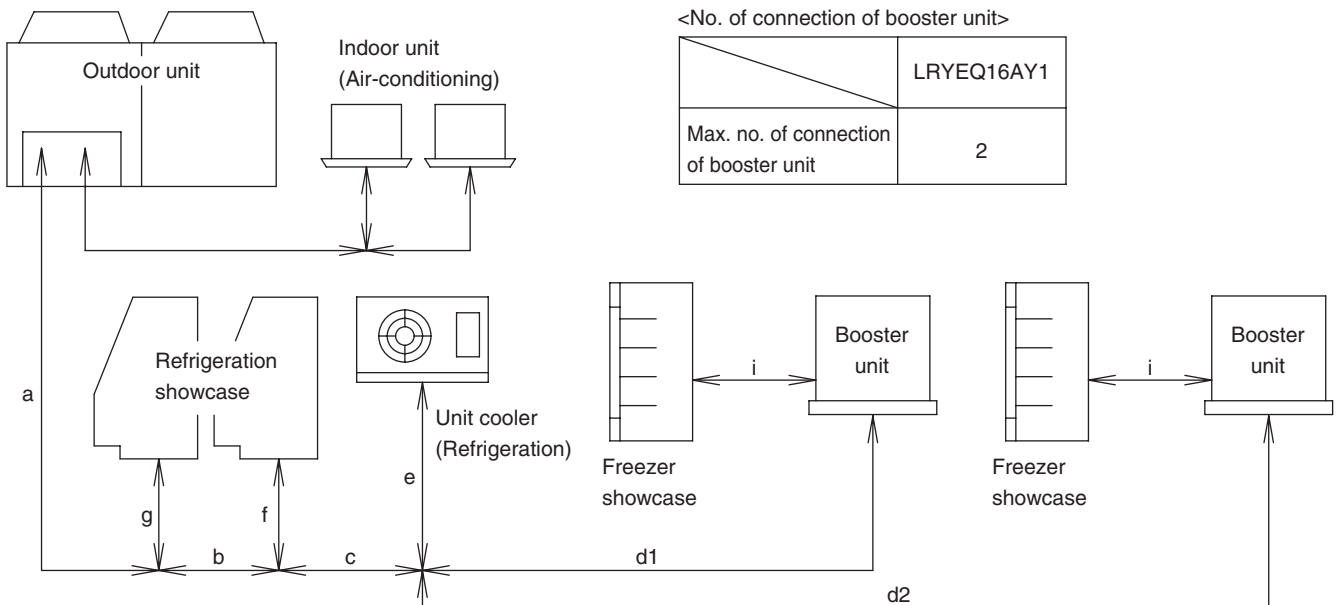
### <Refrigerant piping length and permissible difference in height>

Refer to the installation manual of the outdoor unit for the indoor unit.

|   |   |
|---|---|
| Max. permissible one way piping length (equivalent length)  | $a + b + c + d \leq 130\text{m}$ (d is d1, d2, or e whichever is longer)  |
| Max. branch piping length (actual length)   | $g \leq 30\text{m}$ (d is d1, d2, or e whichever is longer)<br>$b + f \leq 30\text{m}$<br>$b + c + d \leq 30\text{m}$ |
| Between booster unit and refrigeration showcase (equivalent length)                                   | $i \leq 30\text{m}$   |
| Max. difference in height between booster unit and refrigeration showcase (refer to the right figure) | $0 \leq H \leq 10\text{m}$ (Refer to the right figure)  |



### <Example of piping connection>



### <No. of connection of booster unit>

|  |   |
|--|---|
| LRYEQ16AY1                             |   |
| Max. no. of connection of booster unit | 2 |

## 5-2 Protection against Contamination when Installing Pipes

Protect the piping to prevent moisture, dirt, dust, etc. from entering the piping.

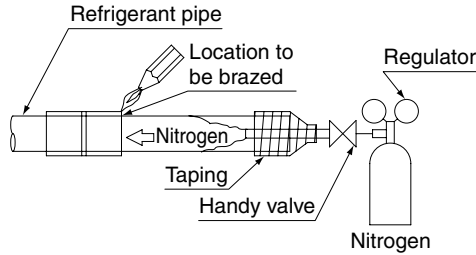
| Place   | Installation period      | Protection method      |
|---------|--------------------------|------------------------|
| Outdoor | More than a month        | Pinch the pipe         |
|         | Less than a month        | Pinch or tape the pipe |
| Indoor  | Regardless of the period |      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

### Note

Exercise special caution to prevent dirt or dust when passing piping through holes in walls and when passing pipe edges to the exterior.

## 5-3 Pipe Connection

- Be sure to perform nitrogen permutation or nitrogen blow when brazing.



Brazing without performing nitrogen permutation or nitrogen blow into the piping will create large quantities of oxidized film on the inside of the pipes, adversely affecting valves and compressors in the refrigerating system and preventing normal operation.

- The pressure regulator for the nitrogen released when doing the brazing should be set to 0.02 MPa (about 0.2kg/cm<sup>2</sup>: Enough to feel a slight breeze on your cheek).

### Note

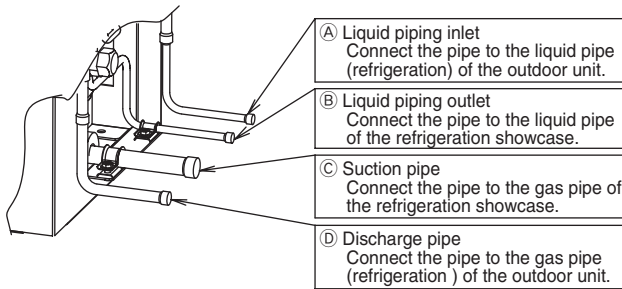
Do not use anti-oxidants when brazing the pipe joints. Residue can clog pipes and break equipment.

## 5-4 Connecting the Refrigerant Piping

### CAUTION

- Do not connect an onsite piping to an incorrect one. Wrong connection will cause a malfunction.

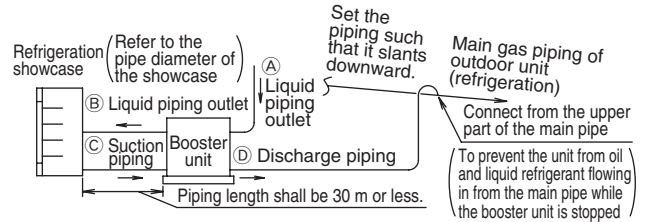
Remove the piping slot cap before connecting the pipe.



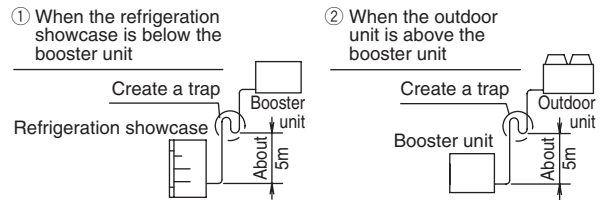
- Do not let the onsite piping contact other piping, the bottom frame and the side panel of the product.

### Precautions for piping

- Always connect the piping within the range of the max. permissible piping length and the permissible difference in height.
- Bend the pipe allowing for a possibly large diameter. Do not bend the pipe repeatedly.
- Install a gauge joint to install the pressure sensor on the inlet and outlet pipes of the booster unit when connecting the AIRNET system (Refer to the Service Manual for details).



- Create a trap on the gas pipe at 5 m intervals if the outdoor unit is located above the booster unit (to ensure the smooth return of oil in the riser pipe (Refer to Figure ① below)).
- Create a trap on the gas pipe at 5 m intervals if the booster unit is located below the outdoor unit (to ensure the smooth return of oil in the riser pipe (Refer to Figure ② below)).



### Operation Method of Shutoff Valves

Follow the instructions below when operating each shutoff valve.

### CAUTION

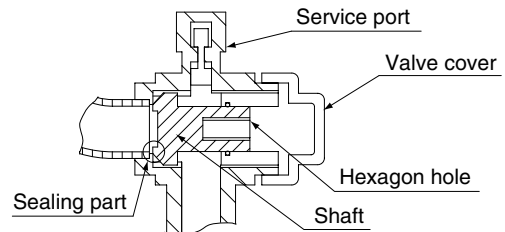
- Do not open the shutoff valve until the steps specified in “6-4 Checking of Device and Installation Conditions” is completed. Do not leave the shutoff valve opened without turning the power on, otherwise refrigerant may be condensed in the compressor and the insulation of the main power supply circuit may be degraded.
- Be sure to use an exclusive tool to handle the shutoff valve. The shutoff valve is not of back sheet type. Excessive force imposed may break the valve.
- Use a charge hose when using the service port.
- Make sure that there is no refrigerant gas leakage after the valve cover and cap are securely tightened.

### (Tightening torque)

Check with the following table the sizes of shutoff valves incorporated by each model and the tightening torque values of the respective shutoff valves.

### Shutoff valve sizes

|                           |      |
|---------------------------|------|
| Liquid side shutoff valve | φ9.5 |
| Gas side shutoff valve    | φ9.5 |



| Shutoff valve sizes | Tightening torque N•m (closes clockwise) |             |              |
|---------------------|--|-------------|--------------|
|                     | Shaft (valve body)                       | Valve cover | Service port |
| φ9.5                | 5.4~6.5<br>Hexagon wrench: 4mm           | 13.5~16.5   | 11.5~13.9    |

### (Opening method)

- Remove the valve cover and turn the shaft anticlockwise with a hexagon wrench.
- Turn the shaft until the shaft stops.
- Tighten the valve cover securely. Refer to the above table for the tightening torque according to the size.

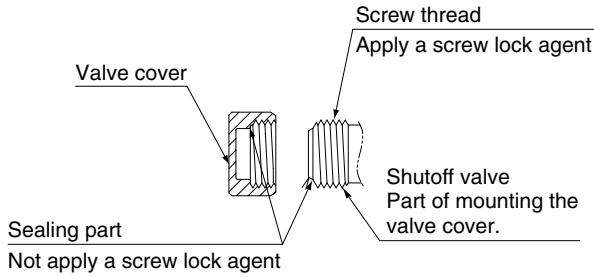


**⟨Closing method⟩**

1. Remove the valve cover and turn the shaft clockwise with a hexagon wrench.
2. Tighten the shaft until the shaft comes in contact with the sealing part of the valve.
3. Tighten the valve cover securely. Refer to the above table for the tightening torque according to the size.

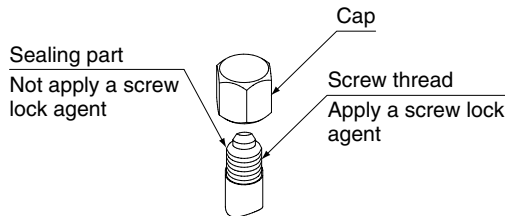
**⟨Handling Precautions for Valve Cover⟩**

- Be careful not to damage the sealing part.
- At the time of mounting the valve cover, apply a screw lock agent to the screw thread.
- Do not apply a screw lock agent (for flare nut use) to the sealing part.
- Be sure to tighten the valve cover securely after operating the valve. Refer to “**Operation Method of Shutoff Valves**” for the tightening torque of the valve.



**⟨Handling Precautions for Service Port⟩**

- Work on the service port with a charge hose provided with a pushing rod.
- At the time of mounting the cap, apply a screw lock agent to the screw thread.
- Do not apply a screw lock agent (for flare nut use) to the sealing part.
- Be sure to tighten the cap securely after the work. Refer to “**Operation Method of Shutoff Valves**” for the tightening torque of the cap.



**⚠ CAUTION**

**Apply a screw lock agent to the valve cover mount and the screw thread of the service port.**

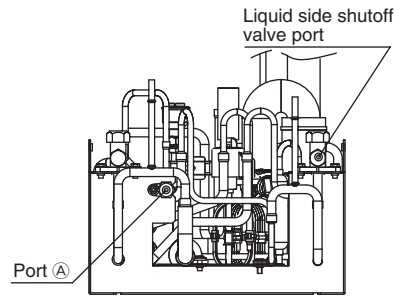
Otherwise, dew condensation water will intrude inside and freeze. Therefore, refrigerant gas leakage or a compressor malfunction may result from the cap deformation or damage.

**5-5 Air Tight Test / Vacuum Drying**

**Ensure the following tests have been conducted after piping.**

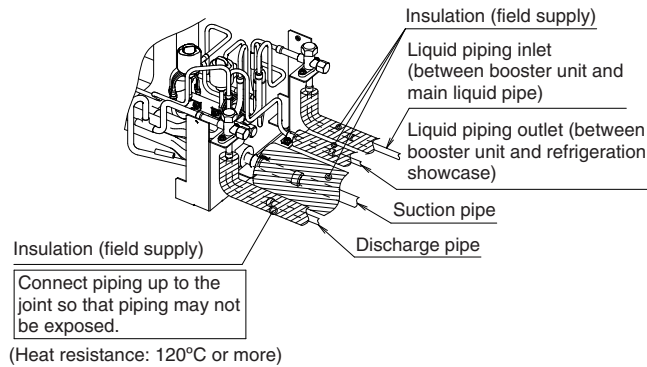
- Check that the gas side and liquid side shutoff valves are open.
- Air tight test - Always use the nitrogen gas. Pressurize the high pressure side (liquid side) to the design pressure (3.8MPa) of the outdoor unit and pressurize the low pressure side (suction side) to the design pressure (2.5MPa) of the indoor unit (field supplied). In this case, they shall be accepted if no pressure drop is found for 24 hours through pressurization at least 5 minutes from the port ① and the liquid shutoff port shown in the right figure. Check if there are any leakage areas in the case of pressure drop.

- Vacuum drying - Refer to the installation manual of the outdoor unit.



**5-6 Thermal Insulation for Piping**

- Always insulate connection pipes and branch pipes on the discharge, suction and liquid sides. The liquid and gas pipe temperature are as follows:  
Liquid pipe arrival minimum temperature:  
5°C (For outdoor unit)  
-10°C (To indoor unit)  
Gas pipe arrival minimum temperature  
-45°C (For indoor unit)  
100°C (To outdoor unit) (Max. temperature)
- Use a discharge pipe whose heat resistance is 120°C or more as its maximum temperature reaches about 100°C. Use a suction pipe and liquid pipe whose heat resistance is 80°C as the standard specification.
- Refer to the installation manual attached to the outdoor unit for the outdoor unit side.



**⚠ CAUTION**

- Always insulate the pipe joint for onsite piping. (An exposed pipe can cause dew condensation and burn by contact.)

## 6. FIELD WIRING

### To Electric Engineering Contractors

- Be sure to install an earth leakage breaker. The product incorporates inverter equipment. In order to prevent the malfunctioning of the earth leakage breaker, make sure that the earth leakage breaker withstands harmonic interference.
- Do not operate the booster unit until refrigerant piping work is completed, or otherwise the compressor will malfunction.
- Do not remove any electrical components such as thermistors or sensors when connecting power supply wires or transmission wires. The compressor may malfunction if the booster unit is operated with such electrical components removed.

---

### CAUTION

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- All field wiring and components must be installed by a licensed electrician and must comply with relevant local and national regulations.
- Be sure to use a dedicated power circuit. Never use a power supply shared by another appliance.
- Never install a phase advancing capacitor. As this unit is equipped with an inverter, installing a phase advancing capacitor will not only deteriorate power factor improvement effect, but also may cause capacitor abnormal heating accident due to high-frequency waves.
- Only proceed with wiring work after blocking off all power.
- Always ground wires in accordance with relevant local and national regulations.
- This machine includes an inverter device. Connect earth and leave charge to eliminate the impact on other devices by reducing noise generated from the inverter device and to prevent leaked current from being charged in the outer hull of the product.
- Do not connect the ground wire to gas pipes, sewage pipes, lightning rods, or telephone ground wires.

**Gas pipes:** can explode or catch fire if there is a gas leak.

**Sewage pipes:** no grounding effect is possible if hard plastic piping is used.

**Telephone ground wires and lightning rods:** dangerous when struck by lightning due to abnormal rise in electrical potential in the grounding.

- Be sure to install an earth leakage circuit breaker.  
This unit uses an inverter, so install the earth leakage circuit breaker that be capable of handling high harmonics in order to prevent malfunctioning of the earth leakage circuit breaker itself.
- Earth leakage circuit breaker which are especially for protecting ground-faults should be used in conjunction with main switch or fuse for use with wiring.

- 
- Electrical wiring must be done in accordance with the wiring diagrams and the description herein.
  - Do not operate until refrigerant piping work is completed.  
(If operated before complete the piping work, the compressor may be broken down.)
  - Never remove thermistor, sensor or etc. when connecting power wiring and transmission wiring.  
(If operated with thermistor, sensor or etc. removed, the compressor may be broken down.)
  - This product have reversed phase protection detector that only works when the power is turned on. If there exists black out or the power goes on and off which the product is operating, attach a reversed phase protection circuit. Running the product in reversed phase may break the compressor and other parts.
  - Attach the power wire securely. Introducing power with a missing N-phase or with a mistaken N-phase will break the unit.
  - Never connect the power supply in reversed phase.  
The unit can not operate normally in reversed phase.  
If you connect in reversed phase, replace two of the three phases.
  - Make sure the electrical unbalance ratio is no greater than 2%. If it is larger than this, the unit's lifespan will be reduced.  
If the ratio exceeds 4%, the unit will shut down and an malfunction code will be displayed on the indoor remote controller.
  - Connect the wire securely using designated wire and fix it with attached clamp without applying external pressure on the terminal parts (terminal for power wiring, terminal for transmission wiring and earth terminal).

- A switch that allows all poles to be switched on and off from the main power supply must be installed.  
This switch must have a contact gap of at least 3 mm.

## 6-1 Example of Wiring Entire System

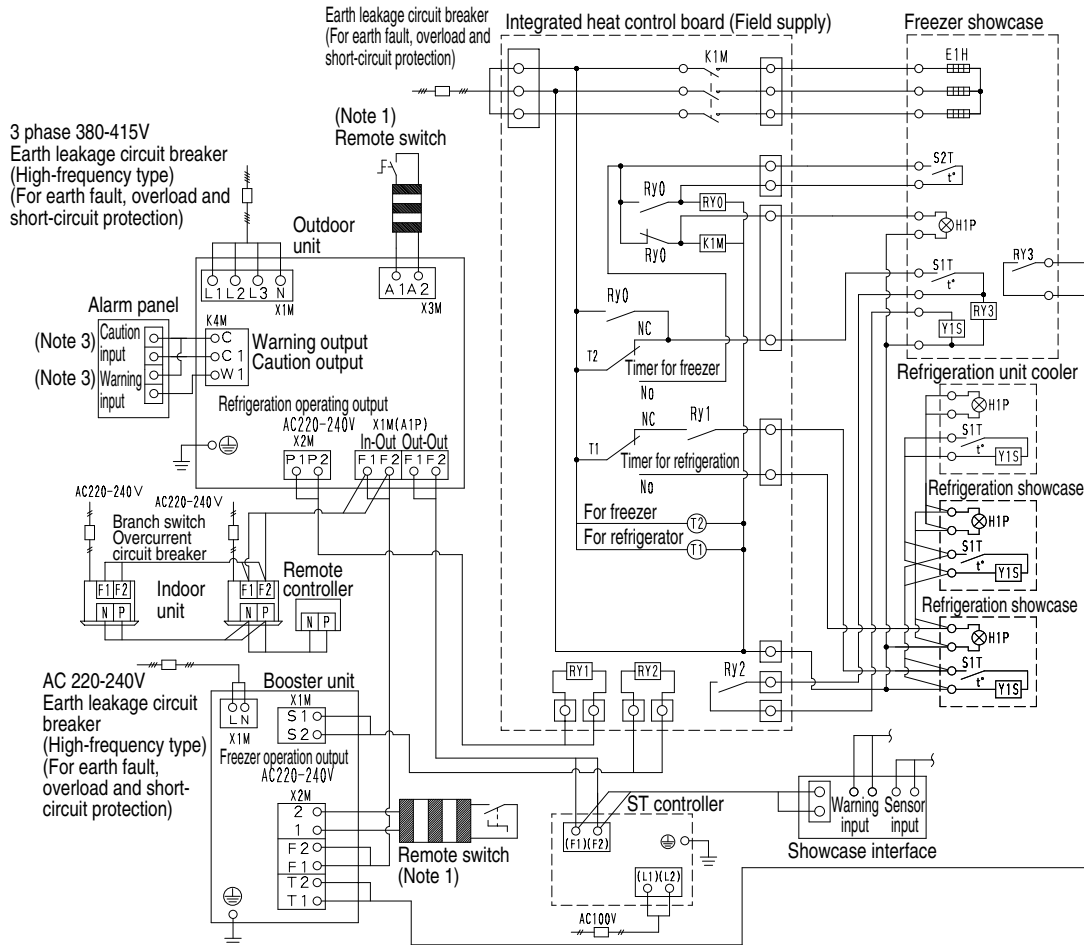
Note:1. For Remote switch, use non-voltage contact for microcurrent (not more than 1mA, 12VDC)

Note:2. Total capacity for warning, alarm : 0.5A or less at AC 220 to 240V.

Capacity for operation output : 0.5A or less at AC 220 to 240V.

Note:3. In case of the malfunction ... Constant a-contact output

|                               |                                  |  |
|-------------------------------|----------------------------------|--|
| T1 ...Timer for refrigeration | 52H ...Electromagnetic contactor | S1T ...Thermostat for inner temperature adjustment |
| T2 ...Timer for freezer       | (Defrost heater)                 | S2T ...Defrost completion thermostat               |
| RY0~RY3 ...Relay              | H1P ...Defrost lamp              | Y1S ...Solenoid valve                              |

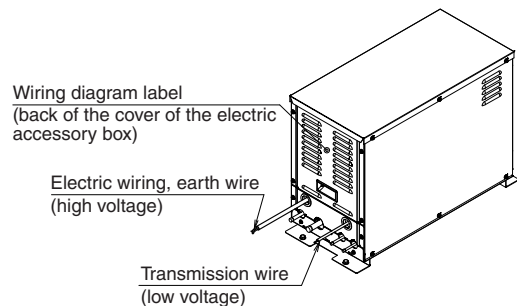


### Note

- Use conduit for power supply wiring.
- Make sure the weak electric wiring (i.e. for the remote controller, between units, etc.) and the power wiring do not pass near each other, keeping them at least 50 mm apart. Proximity may cause electrical interference, malfunctions, and breakage.
- Be sure to connect the power wiring to the power wiring terminal block and secure it as described in “6-2 Procedure for Incoming Wiring”.
- Do not connect the power supply to the terminal block for the transmission wiring for warning, alarm, operation output, and remote operation switch. Otherwise the entire system will be damaged.
- Transmission wiring should be secured as described in “6-3 Wiring Connection”.
- Secure wiring with clamp such as insulation lock ties to avoid contact with piping.
- Shape the wires to prevent the structure such as the control box lid deforming. And close the cover firmly.

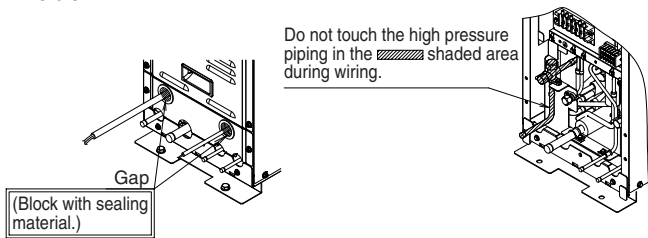
## 6-2 Procedure for Incoming Wiring

- Route high voltage wiring (power supply wire, earth wire and refrigeration operation output wiring) through the wiring openings located on the side of the unit (through holes on the left side).



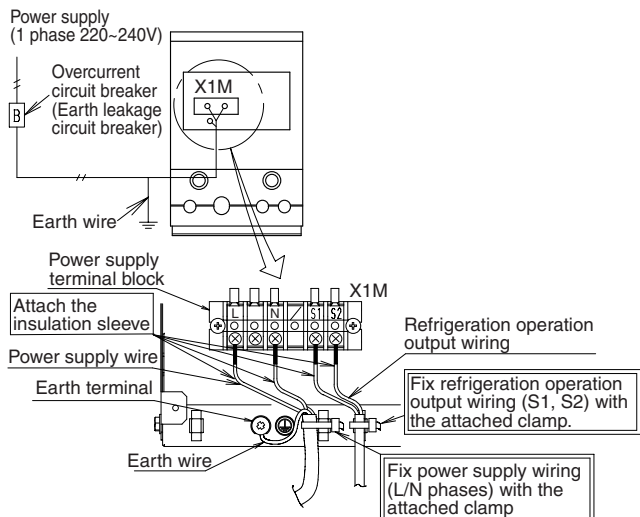
- Route low voltage wiring (transmission wire, refrigeration operation input wiring and remote switch wire) through the wiring openings located on the side of the unit (through holes on the right side).

- Block the gap (shaded area shown in the figure below) with sealing material such as putty if an intrusion by small creatures is possible.

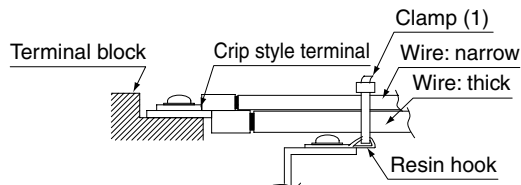


### 6-3 Wiring Connection

#### High voltage wiring (Power supply wiring, Refrigeration operation output wiring, and earth wire)



- When two wires are connected to a single terminal, connect them so that the rear sides of the crimp contacts face each other.
- Also, make sure the thinner wire is on top, securing the two wires simultaneously to the resin hook using the accessory clamp (1).



#### Power circuit, safety device, and cable requirements

- A power circuit (see the following table) must be provided for connection of the unit. This circuit must be protected with the required safety devices, i.e. a main switch, a slow blow fuse on each phase and an earth leakage circuit breaker.
- Use copper conductors only.
- Use insulated wire for the power cord.
- Select the power supply cable type and size in accordance with relevant local and national regulations.
- Specifications for local wiring are in compliance with IEC60245.
- Use wire type H05VV when protected pipes are used.
- Use wire type H07RN-F when protected pipes are not used.

|           | Phase and frequency | Voltage  | Minimum circuit amp. | Recommended fuses |
|-----------|---------------------|----------|----------------------|-------------------|
| LCBKQ3AV1 | φ1, 50Hz            | 220-240V | 15A                  | 20A               |

#### Refrigeration operation output wire specifications

|                         |                          |
|-------------------------|--------------------------|
| Electric wire thickness | 0.75~1.25mm <sup>2</sup> |
| Max. wiring length      | 130m                     |

#### CAUTION

- Refer to the "6-1 Example of Wiring Entire System" by all means when connecting the operation output wiring. A compressor failure may result if the operating output wiring is not connected.

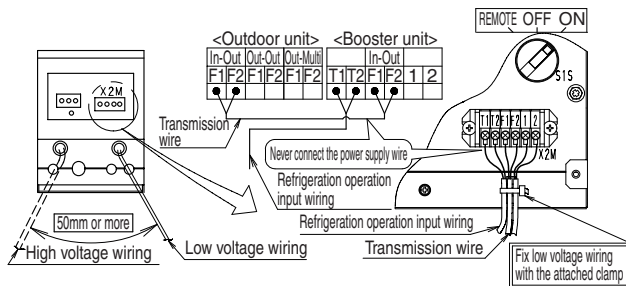
#### Low voltage wiring (transmission wire, refrigeration operation input wiring and remote switch wire)

Connect low voltage wiring between the booster unit and the outdoor unit, the booster unit and the integrated heat control board and the remote switch by referring to the figure below.

#### <Precautions for low voltage wiring>

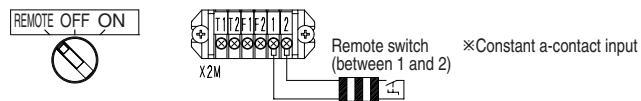
- Never connect the 220-240V power supply to the terminal block of low voltage wiring. The entire system could be damaged.
- Isolate low voltage wiring from high voltage wiring (power supply wire, refrigeration operation output wiring and earth wire) by at least 50 mm.
- Always install low voltage wiring using vinyl cord with a 0.75-1.25 mm<sup>2</sup> sheath or cable (duplex).
- Install low voltage wiring within the limit described below. Exceeding the limit can cause transmission problems.  
Distance between the booster unit and the outdoor unit: 100 m

#### <Connection for transmission wire and refrigeration operation input wiring>



#### <Connection for remote switch wire>

- Set the operation switch to "Remote" as shown in the figure below to remotely start up and shut down.
- Use a remote switch that has a contact assuring the minimum applicable load of DC12V/1mA.



### 6-4 Checking of Device and Installation Conditions

Be sure to check the followings.

#### <For those doing electrical work>

See "6-2 Procedure for Incoming Wiring".

- Make sure there is no faulty power wiring or loosening of a nut.  
See "6-3 Wiring Connection".
- Has the insulation of the main power circuit deteriorated?  
Measure the insulation and check the insulation is above regular value in accordance with relevant local and national regulations.

#### <For those doing pipe work>

- Make sure piping size is correct.  
See "5-1 Selection of Piping Material".
- Make sure insulation work is done.  
See "5-6 Thermal Insulation for Piping".
- Make sure there is no faulty refrigerant piping.  
See "5. REFRIGERANT PIPING".

## 7. CHECKS AFTER WORK COMPLETION

- Make sure the following works are complete in accordance with the installation manual.
  - Piping work
  - Wiring work
  - Air tight test/Vacuum drying
  - Installation work for indoor unit (Refrigeration unit cooler, refrigeration showcase, freezer showcase, air-conditioner)
  - Installation work for outdoor unit
  - Drainage water

## 8. REFRIGERANT REPLENISHMENT

Operation the booster is not needed to replenish refrigerant. Follow the installation manual of the outdoor unit for the replenishment procedure.

## 9. TEST RUN

### For test run operators

Do not operate the outdoor unit alone on a trial basis. Use the following procedure to perform a test run after installation work is complete for the entire system:

#### Test run procedure

1. Fully open the shutoff valves on the gas and liquid side of the outdoor unit and the booster unit.
2. Check that the electric accessory box lids of the outdoor unit, the booster unit and the indoor unit (air-conditioner, refrigeration showcase, refrigeration unit cooler) and the piping cover of the outdoor unit and the booster unit are closed. Then turn on the outdoor, the booster unit and indoor units (air conditioner, refrigeration showcase, refrigeration unit cooler).
3. Turn on the operation switch from the inspection door of the outdoor unit and the booster unit. (The outdoor fan rotates in about 10 minutes after the operation switch is turned on and the compressor starts.)
4. Push the ON/OFF button on the remote controller of the outdoor unit (air-conditioner) to operate the unit.
5. Check the sealing condition through the sight glass of the outdoor unit. In case of shortage of refrigerant, check if the refrigerant is charged to the specified level.
6. Check the following on each unit.

|                           |   |
|---------------------------|---|
| Refrigeration showcase    | Cold air should be blowing and the temperature should decrease to the preset level. |
|                           | The unit should start defrosting operation by the time set on the timer.            |
| Refrigeration unit cooler | Cold air should be blowing and the temperature should decrease to the preset level. |
|                           | The unit should start defrosting operation by the time set on the timer.            |
| Air-conditioner           | Cold air (or hot air) should be blowing.  |

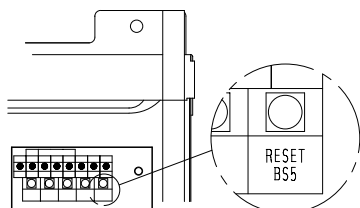
7. Be sure to turn off the operation switch before turning off the power.

#### Error diagnosis

- Check the following if nothing is displayed on the remote controller during the test run.

#### <Indoor unit (air-conditioner)>

1. Is the power turned on?
  2. Is the wire broken or incorrectly wired (between the power, the indoor unit and the remote controller)?
  3. Has the fuse on PCB melted?
- If you have changed the power wire and the transmission line, keep the power of the indoor unit (air conditioner, refrigeration showcase, refrigeration unit cooler) and the integrated heat control board turned on, turn off the operation switch of the outdoor units and never fail to press the push button switch (BS5) on PCB (A1P) in the electric accessory box (right) of the outdoor unit for at least 10 seconds (Open the inspection door (right) on the upper right portion of the electric accessory box and operate the push button switch (BS5) using an insulating rod). (See the right figure.)



Inspection door (right)  
(Upper right portion of the electric accessory box)

- Refer to the Service Manual for other malfunction codes.
- Take the following action if you find a malfunction code on the remote controller during the test run.

| Malfunction code | Defect at installation  | Action to be taken   |
|------------------|---|--|
| E3, E4           | Shutoff valves closed   | Fully open the shutoff valves.   |
| EJ               | Wiring error or booster malfunction of the transmission wire between the booster and the outdoor unit | Check the transmission wire between the booster and the outdoor unit. If the malfunction code persists, check the LED on the print board (A2P) in the electric accessory box of the booster unit. Refer to the Service Manual for the checking method. |
| L4               | The air passage is blocked.   | Remove obstacles blocking the air passage.   |
| U1               | Reverse-phase of the power supply   | Exchange two wires out of three power supply wires.  |
| U2               | Voltage drop  | Check the voltage drop.  |
| U4, UF           | Wrong wiring of transmission lines between units  | Check the connection of transmission lines between the outdoor unit and the air conditioner.   |
| UA               | In the case of system discrepancy   | Check if the air conditioner is connected as should be assembled.  |
| E2               | Electric leak   | See *1.  |

\*1

Set the operating switch to the "OFF" position to reset the power supply and then return the switch to the "ON" position to restart the unit. If the problem persists, refer to the Service Manual.

### CAUTION

- Do not disconnect the power supply for 1 minute after setting the operating switch to "ON". Electric leak detection is performed for several seconds after the operating switch is set to "ON" and each compressor starts operating, so disconnecting the power supply during that time will result in a false detection.

### For dealers

- After the test run is finished, check that the piping cover and front panel are mounted.
- At the time of delivery to the customer, use the Operation Manual and fully explain the handling of the equipment.
- For precautions at the time of delivery, refer to the provided Installation Manual for each unit as well.

