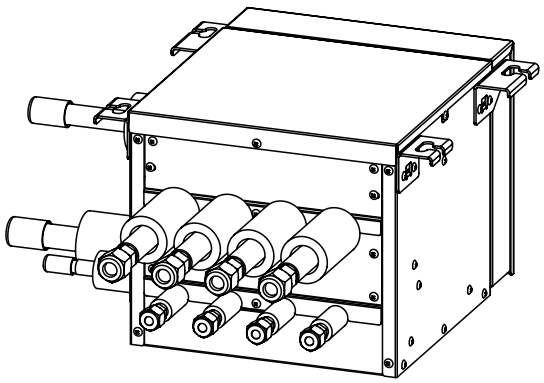
Installation Manual

for
Cooling / Heating
Change-Over Box

Models:

COB04M132B22S
COB08M264B22S
COB12M264B22S



IMPORTANT:

READ AND UNDERSTAND THIS MANUAL CAREFULLY BEFORE INSTALLING THIS CHANGE-OVER BOX. KEEP THIS MANUAL FOR FUTURE REFERENCE.

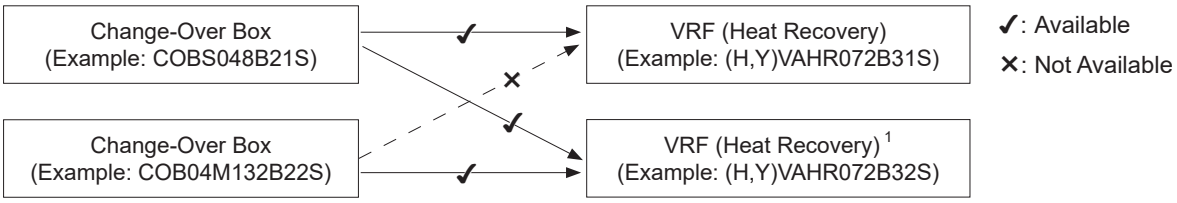
P5417012

Compatibility for Single Port Change-over box models [COBS_B21S(C)], Single Port Change-over box models [COBS_B22S(C)], and Multi Port Change-over box models (COBS_M_B22S)

- Single Port Change-over box models [COBS_B22S(C)], Multi Port Change-over box models (COBS_M_B22S), and Single Port Change-over box models [COBS_B21S(C)] cannot operate in the same system together.
- Single Port Change-over box models [COBS_B22S(C)] and Multi Port Change-over box models (COBS_M_B22S) are only compatible with the outdoor units [(H,Y)VAHR_B(3,4,5)2S] and the water source units [(H,Y)VWHR_B(3,4)2S].

  The wired controller will display the alarm code C4 and the outdoor units [(H,Y)VAHR_B3(4)1S] will not operate if the Single Port Change-over box models [COBS_B22S(C)] and Multi Port Change-over box models (COBS_M_B22S) are mismatched with outdoor units [(H,Y)VAHR_B3(4)1S].
- Single Port Change-over box models [COBS_B21S(C)] are compatible with both the outdoor units [(H,Y)VAHR_B3(4)1S] and [(H,Y)VAHR_B(3,4,5)2S] with limitations.
  Single Port Change-over box models [COBS_B21S(C)] are not compatible with the water source unit.
  The wired controller will display the alarm code 30 and the units will not operate if the Single Port Change-over box models [COBS_B21S(C)] are mismatched with a water source unit.

  Refer to the Heat Recovery Installation and Maintenance Manual for more details.



1. Not available for water source unit.

- Single Port Change-over box models [COBS_B21S(C)] are being discontinued. However, they will be supplied for servicing and maintenance until further notice. If there is a need for a replacement or parts for the Single Port Change-over box models [COBS_B21S(C)] , please call Tech Support at: 1-844-873-4445 (option 2).

IMPORTANT NOTICE

- The applicable outdoor unit may be different depending on the product series.
  Improper combination causes the unit to malfunction and an alarm will be triggered. Be sure to confirm with the product catalogue before installation.
- Johnson Controls-Hitachi Air Conditioning pursues a policy of continuous improvement in the design and performance of products to meet regulatory requirements and industry standards. Therefore, Johnson Controls-Hitachi Air Conditioning reserves the right to revise specifications without notice.
- Johnson Controls-Hitachi Air Conditioning cannot anticipate every possible circumstance that might involve a potential hazard.
- This heat pump air conditioner is designed for standard air conditioning applications only. Do not use this heat pump air conditioner for other purposes, such as drying clothes, refrigerating foods, or for any other cooling or heating process.
- Do not install the unit outdoors. Do not install the unit in the following places. It may cause a fire, deformation, corrosion or failure.
  * Places where there are high levels of oil mist (including machinery oil).
  * Places where there are high alkalinity levels (i.e., chlorine or bromine such as over hot tubs, etc.).
  * Places where flammable gases or liquids may be used or generated.
  * Places with a high concentration of salts, salty mists or sprays (such as over salt-water aquariums).
  * Places with an atmosphere of high nuisance dust. Places with organic solvent atmospheres, such as painting and cleaning locations.
- Do not install the unit in the place where condensate water can leak onto the unit or damage may occur.
- Pay attention to the following points when the unit is installed in a hospital or other facility where electromagnetic waves generate from medical equipment.
  * Do not install the unit in places where electromagnetic waves radiate to the electrical box, wired controller cable or wired controller.
  * Install the unit at least 10 ft (3m) away from electromagnetic waves or interferences such as a radio.
- The installer and system specialist shall secure against leakage according to local regulations or standards. This system has both high and low pressure refrigerant and, as such, comprises a pressurized system. Never loosen threaded joints while the system is under pressure and never open pressurized system parts.
- No part of this manual may be reproduced without written permission from Johnson Controls-Hitachi Air Conditioning.
- It is assumed that this unit will be operated and serviced by English speaking people.
  If this is not the case, the distributor or dealer can provide or add safety, caution and operating signs in the native language.
- If you have any questions, contact your distributor.

This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage.
  Inspect all electrical connections. Connections must be clean and tight at the terminals.
  Claims for damage either apparent or concealed, should be filed immediately with the shipping company.
  NOTE: Rough handling may dislocate internal components.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct with the ordering and shipping information, to ensure the correct unit has been shipped.
  To minimize the possibility of damage after inspection, the units should be installed as soon as possible.

The standard installation and general use of this unit is explained in this manual.
Although common processes and procedures for installing units are presented in this manual, its use for installation of units otherwise indicated in this manual is not recommended. Please contact your local agent, as the occasion arises.
Our liability shall not cover defects arising from the alteration performed by a customer without our consent in a written form.

SAFETY SUMMARY

Signal Words

- Signal words are used to identify levels of hazard seriousness.
  Definitions for identifying hazard levels are provided below with their respective signal words.

⚠ DANGER : DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING : WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION : CAUTION used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE : NOTICE is used to address practices not related to personal injury.

NOTE : NOTE is useful information for operation or maintenance.

SAFETY SUMMARY

⚠ DANGER

- Do not perform installation work, refrigerant piping work, condensate pump, or condensate piping and electrical wiring connection without referring to the Installation Manual. If the instructions are not followed, it may result in a water leakage, electric shock or a fire.
- Use the specified non-flammable refrigerant (R410A) for the outdoor unit in the refrigerant cycle. Charge only R410A into the unit. Do not charge other materials into the unit such as hydrocarbon refrigerants (propane), oxygen, flammable gases (acetylene) or poisonous gases when installing, maintaining and moving the unit. These flammables are extremely dangerous and may cause an explosion, a fire, or injury. As originally manufactured, this unit contains refrigerant installed by Johnson Controls-Hitachi Air Conditioning. Johnson Controls-Hitachi Air Conditioning uses only refrigerants that have been approved for use in the unit's intended country or market. Johnson Controls-Hitachi Air Conditioning' distributors similarly are only authorized to provide refrigerants that have been approved for use in the countries or markets they serve. The refrigerant used in this unit is identified on the unit's faceplate and/or in the associated manuals. Any additions of refrigerant into this unit must comply with the country's requirements with regard to refrigerant use and should be obtained from JCI distributors. Use of unapproved refrigerant substitutes will void the warranties and can cause injury or death.
- Do not pour water into the indoor or outdoor unit. These units are equipped with electrical parts. Exposure to water may cause a serious injury.
- Do not open the service cover or access panel for the indoor or outdoor units without turning OFF the main power supply.
- Do not touch or adjust safety devices inside the indoor unit or outdoor units. If these devices are touched or readjusted, it may cause serious injury.
- Carefully check for leaking refrigerant gas. If there is significant leakage, it can cause difficulty in breathing. Turn OFF the main switch, and contact your service contractor if refrigerant leakage occurs.
- Make sure that the refrigerant leakage test is performed.
  Refrigerant (fluorocarbon) for this unit is non-flammable and odorless.
  However refrigerant that comes in contact with flames will create toxic gas.
  Because the refrigerant is heavier than air, the floor surface will be filled with it, which could cause suffocation.
- The installer and system specialist shall secure against refrigerant leakage according to local regulations or standards.
- Recommended to use a Ground Fault Circuit Interrupter (GFCI).
  In the event of fault, there is danger of an electric shock or a fire if it is not used.

SAFETY SUMMARY

⚠WARNING

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately 4 ft (1.3m) of the system.
- If the circuit breaker or fuse is blown, stop the system and contact your service contractor.
- Electrical shock may occur if unit is not grounded correctly. Ensure a secure ground connection. Do not connect the ground wiring to gas piping, condensate piping, lightning conductor or ground wiring for telephones.
- Before performing any brazing work, ensure there is no flammable material around. When using refrigerant, be sure to wear proper gloves to prevent frostbite.
- Insulate wiring, condensate piping and electrical components from extreme temperatures and burring animals. Failure to do so can, over time, deteriorate system performance.
- For more details of the refrigerant piping and height limitations, refer to the Installation and Maintenance Manual for the Outdoor Unit.
- Secure all wire connections outside forces on the terminals may cause fire. Unauthorized modifications to this unit are prohibited for the following reasons:

  1. Modifications may create hazards which could result in death, serious injury or equipment damage.

  2. Modifications will void product warranties.

  3. Modifications may invalidate product regulatory certifications. Johnson Controls-Hitachi Air Conditioning has conducted both internal and coordinated Agency testing to ensure product compliance with applicable Product Safety and Regulatory standards. Product certification is designated either on the product itself or in the product literature. The certification mark identifies the applicable standards as well as the Agency or Nationally Recognized Test Lab (NRTL) involved. If changes are made to the product, an engineering review will be needed to assess the impact to the product certification. In some instances, the changes may be such that the Agency or NRTL will require reapproval of the product by means of a field or site inspection and certification. Any person or entity making changes to the product is responsible for obtaining any necessary engineering review and reapproval.

  4. Modifications may violate OSHA standards. OSHA standards may require that only certified products be used in certain applications and modifications that result in the loss of product certification may violate those OSHA standards:
  "If a product does not have NRTL approval as required by an OSHA standard, or if the product no longer meets NRTL approval requirements because of changes made to it, the product must be

  (1) replaced with a properly approved product,
  (2) approved by an NRTL that is recognized for testing this type of product, or
  (3) reinspected and reapproved by an NRTL, if it was properly approved but the user has changed it."
- If installed in a small room, take measures to prevent the refrigerant from exceeding the maximum allowable concentration in the event that refrigerant gases should escape. The installation should meet requirements in ASHRAE Standards 15 and 34. If refrigerant gas has leaked during the installation work, ventilate the room immediately.
- Tighten the flare nut with a torque wrench in the specified manner. Do not apply excessive force to the flare nut when tightening. If you do, the flare nut can crack and refrigerant leakage may occur.
- When maintaining, relocating or disposing of the unit, dismantle the refrigerant piping after the compressor stops.
- 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 serious injury or death.
- Perform all electrical work in strict accordance with this Installation and Maintenance Manual and all relevant regulatory standards.
- Use specified cables between units.

⚠WARNING

- Be sure to install circuit breakers (ground fault interrupter, isolating switch, molded case circuit breaker and so on), with the specified capacity. Ensure that the wiring terminals are tightened securely to recommended torque specifications. If a circuit breaker or fuse is frequently blown, shut down the system and contact your service contractor.
- Clamp electrical wires securely with a cable clamp after all wiring is connected to the terminal block. In addition, run wires securely through the wiring access channel.
- When installing the main power lines, do not apply tension to the cables. Secure the suspended cables at regular intervals according to local codes, but not too tightly.
- After stopping operation, be sure to wait at least five minutes before turning off the main power switch. Otherwise, water leakage or electrical breakdown may result. Disconnect the power supply completely before attempting any maintenance for electrical parts. Check with a voltage meter to ensure that no residual voltage is present after disconnecting the power supply.
- Insulate the refrigerant pipe connection to prevent condensation.
- Be sure to attach the cover so that it fits securely on the electrical box without any gaps. Secure the cover with screws.
- Ensure a secure ground connection. Do not connect ground wiring to gas piping, water piping, lightning conductor, or telephone ground wiring. Inadequate grounding can cause an electric shock.

⚠CAUTION

- Do not step on the unit.
- Do not put any foreign material on the unit or inside the unit.
- Provide a strong and correct foundation so that:
  - The outdoor unit is not on an incline.
  - Abnormal sound does not occur.
  - The outdoor unit will not fall down due to a strong wind or earthquake.

NOTICE

- Be careful that moisture, dust, or variant refrigerant compounds not enter the refrigerant system during installation work. Foreign matter could damage internal components or cause blockages.
- Do not install the indoor unit, outdoor unit, wired controller and cable within approximately 10 ft (3m) of strong electromagnetic wave radiators such as medical equipment.
- After a long shutdown, apply power to the outdoor unit(s) at least 12 hours prior to operation of the system for preheating of the compressor oil.

NOTE

- The heating capacity of the heat pump unit is decreased according to the outdoor air temperature. Therefore, it is recommended that auxiliary heating equipment be used in the field when the unit is installed in a low temperature region.

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1. Safety Summary

⚠WARNING

- **Do not perform installation work, refrigerant piping work or electrical wiring connection without referring to our Installation Manual.**
- **Check that the ground wire is securely connected.**
- **Connect a fuse of specified capacity.**

⚠CAUTION

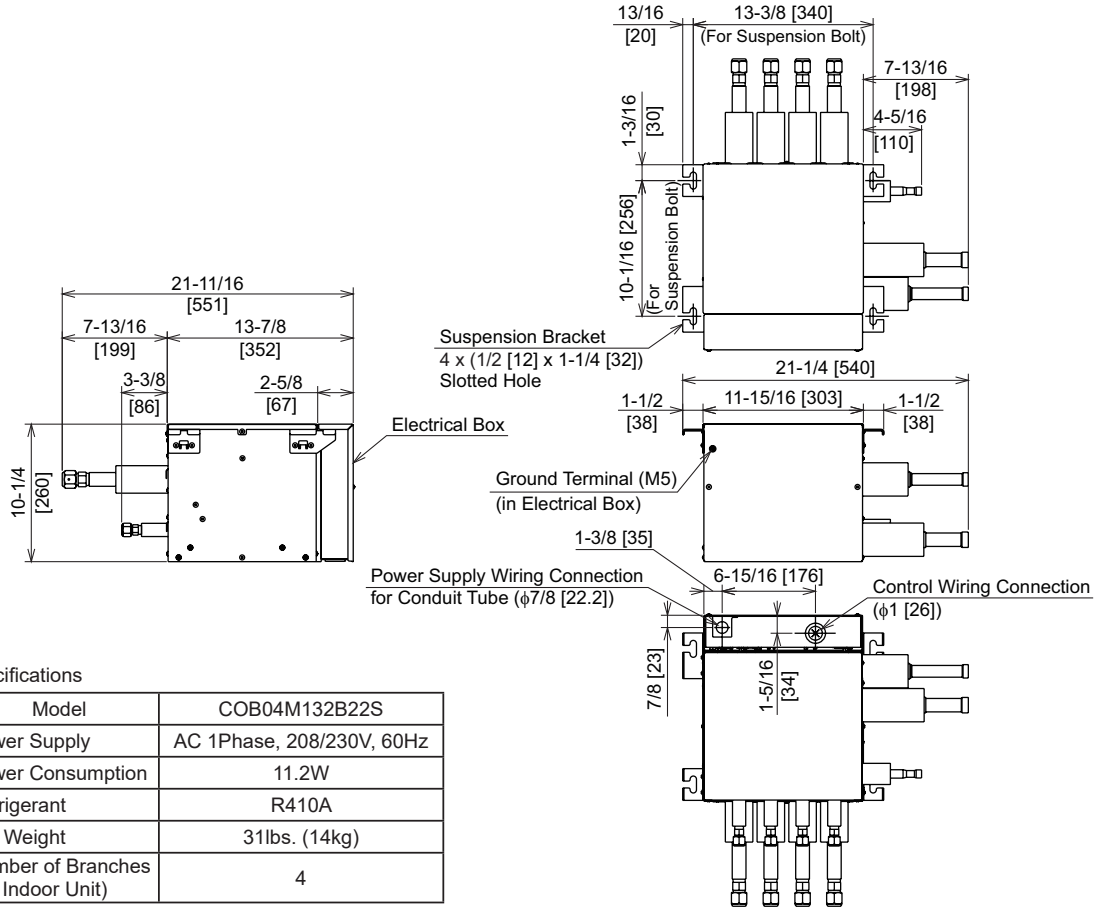
- **Do not install the Change-Over Box and cable within approximately 10 ft (3m) from strong electromagnetic wave radiators such as medical equipment.**
- **For more details of the refrigerant piping and height limitations, refer to the Installation and Maintenance Manual for the Outdoor Unit.**

2. Structure

2.1 Dimensions

COB04M132B22S

Unit: inch [mm]



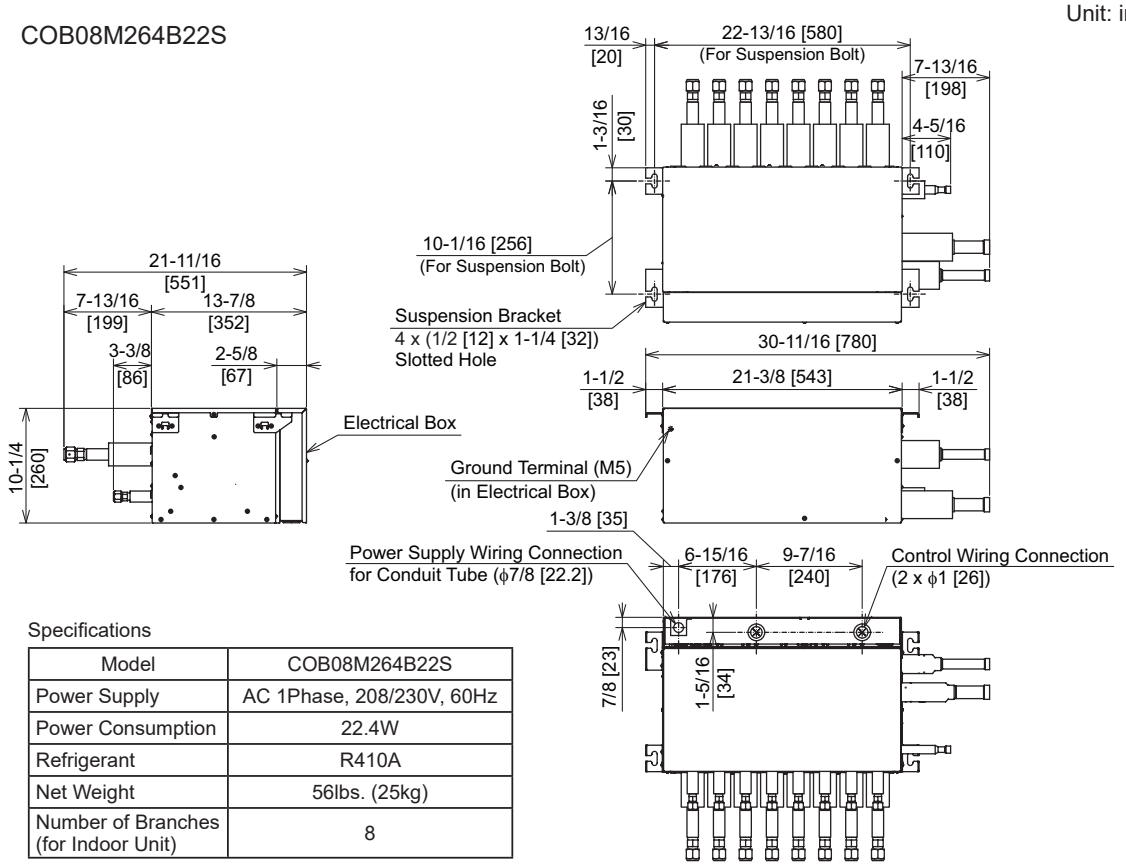
Specifications

Model	COB04M132B22S
Power Supply	AC 1Phase, 208/230V, 60Hz
Power Consumption	11.2W
Refrigerant	R410A
Net Weight	31lbs. (14kg)
Number of Branches (for Indoor Unit)	4

Figure 2.1 Dimensions of Change-Over Box

Unit: inch [mm]

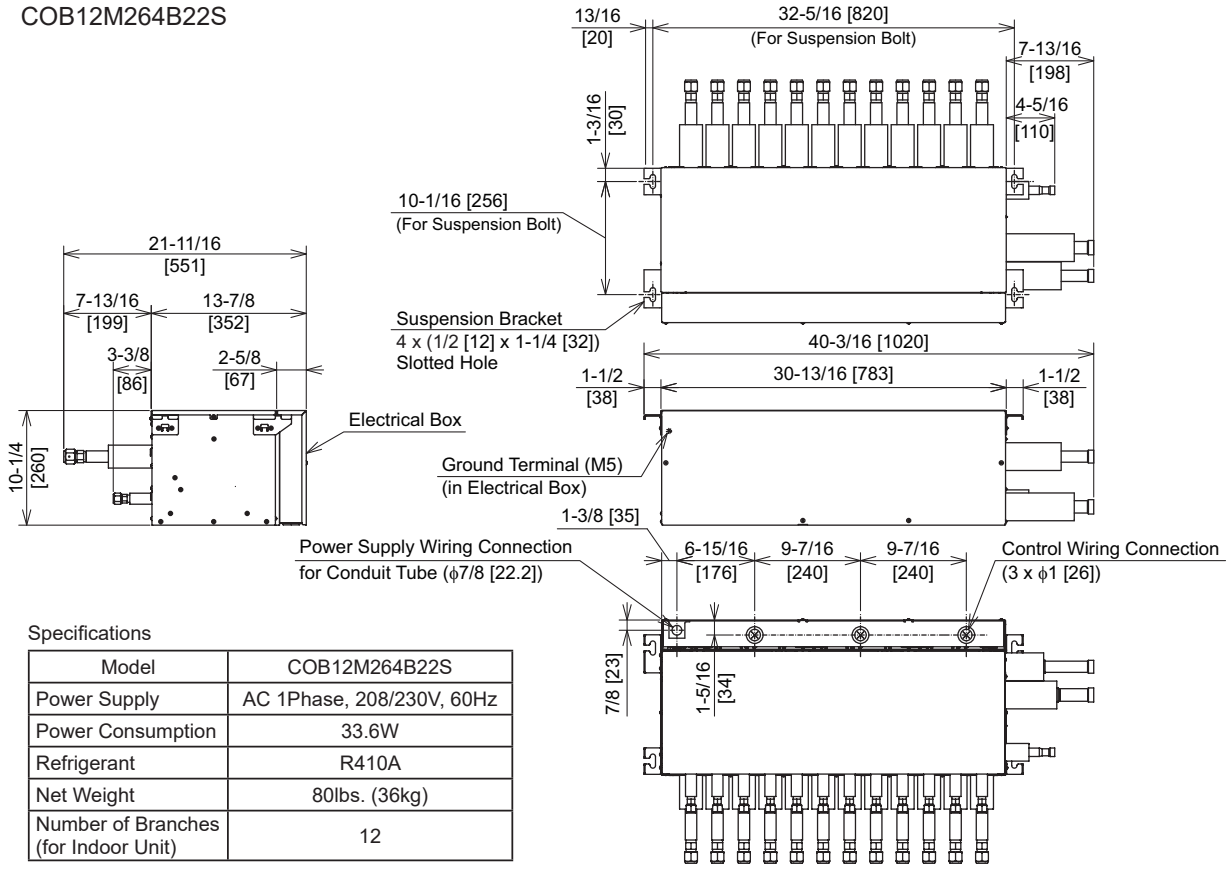
COB08M264B22S



Specifications

Model	COB08M264B22S
Power Supply	AC 1Phase, 208/230V, 60Hz
Power Consumption	22.4W
Refrigerant	R410A
Net Weight	56lbs. (25kg)
Number of Branches (for Indoor Unit)	8

COB12M264B22S



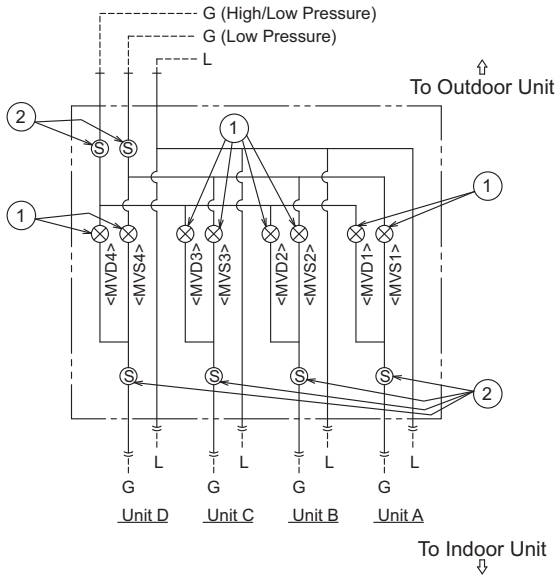
Specifications

Model	COB12M264B22S
Power Supply	AC 1Phase, 208/230V, 60Hz
Power Consumption	33.6W
Refrigerant	R410A
Net Weight	80lbs. (36kg)
Number of Branches (for Indoor Unit)	12

Figure 2.2 Dimensions of Change-Over Box

2.2 Refrigeration Cycle

COB04M132B22S



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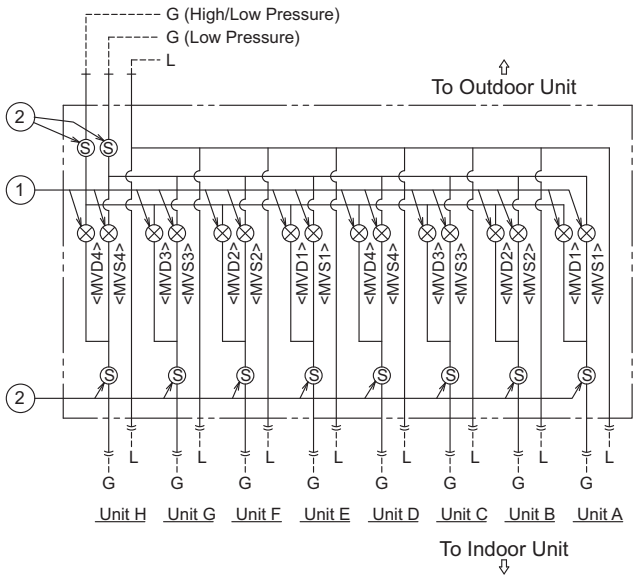
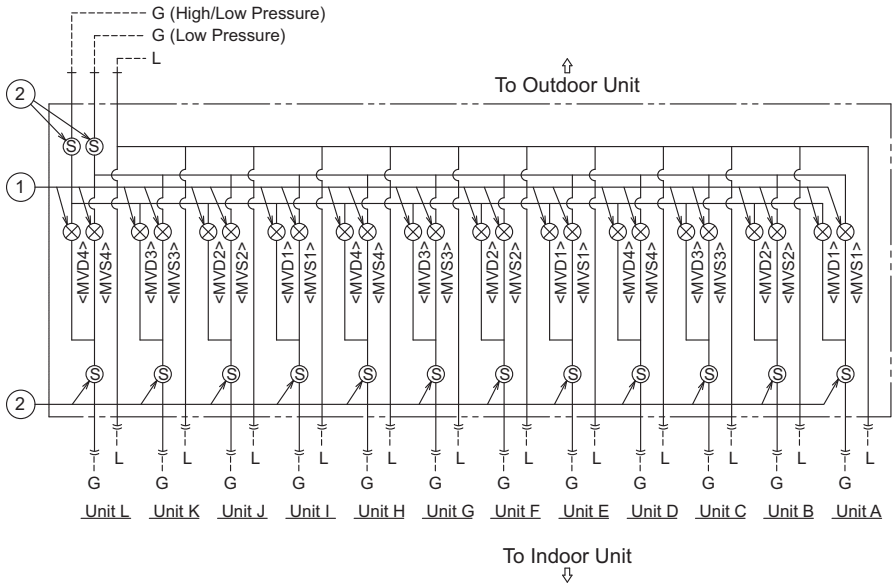


COB12M264B22S



Mark	Part Name
(1)	Electronic Expansion Valve
(2)	Strainer

G : Refrigerant Gas Pipe Connection
L : Refrigerant Liquid Pipe Connection
- - - - : Field Refrigerant Piping
⊣⋘ : Flare Connection
⊣⊢ : Brazing Connection
: Change-Over Box

Figure 2.3 Refrigeration Cycle Diagram

2.3 Necessary Tools and Instrument List for Installation

No.	Tool	No.	Tool
1	Handsaw	11	Wrench
2	Phillips Screwdriver	12	Charging Cylinder
3	Vacuum Pump	13	Manifold Gauge
4	Refrigerant Gas Hose	14	Wire Cutter
5	Megohmmeter	15	Gas Leak Detector
6	Copper Pipe Bender	16	Level
7	Manual Water Pump	17	Crimper for Solderless Terminals
8	Pipe Cutter	18	Hoist (for Indoor Unit)
9	Brazing Kit	19	Ammeter
10	Hex Wrench	20	Voltage Meter

NOTE:
Use tools and measuring instruments (vacuum pump, refrigerant hose, charging cylinder, and manifold gauge) exclusively for the refrigerant R410A.

3. Transportation and Handling

3.1 Transportation

Transport the product as close to the installation location as practicable before unpacking.

⚠CAUTION

Do not put any material on the product.

3.2 Handling of Change-Over Box

⚠WARNING

Do not put any foreign material into the indoor unit and check to ensure that none exists in the Change-Over Box before the installation and test run. Otherwise, a fire or failure, or something similar may occur.

⚠CAUTION

Be careful not to damage insulation materials of unit's surface when lifting.

3.3 Combination of Change-Over Box and Indoor Unit

Combinations are as follows.

Table 3.1 Combinations of Indoor Units

Model		COB04M132B22S	COB08M264B22S	COB12M264B22S
Number of Branches (for Indoor Unit)		4	8	12
Single Unit Per Branch	Maximum Total Capacity of All Connected Indoor Units	132MBH or less	264MBH or less	264MBH or less
	Maximum Total Capacity of Connected Indoor Units Per Branch	96MBH [2] or less	96MBH [2] or less	96MBH [2] or less
Multiple Units Per Branch	Maximum Number of Connected Indoor Units Per Branch	6	6	6
	Maximum Total Capacity of All Connected Indoor Units	114MBH or less	216MBH or less	216MBH or less
	Maximum Total Capacity of Connected Indoor Units Per Branch	41MBH or less	41MBH or less	41MBH or less

NOTES:

1. Exceeding the total capacity may cause insufficient performance and abnormal sound. Be sure to connect the Change-Over Box within the allowable total capacity.
2. Up to two 60, 72 or 96 type indoor units can be connected to the change-over box within the "Maximum Total Capacity of All Connected Indoor Units" shown in above table.
   Make sure to increase the pipe connection size by using the appropriate accessory pipe.

4. Change-Over Box Installation

⚠ DANGER

- **Do not install the Change-Over Box in a flammable environment to avoid fire or an explosion.**

⚠ WARNING

- **Check to ensure that the ceiling slab is strong enough.**
- **Do not install the Change-Over Box outdoors. If installed outdoors, an electric hazard or electric leakage may occur.**
- **Installation WARNING: Ensure that all safety features, disconnects and interlocks are in place and functioning properly prior to putting the equipment into operation. Never by-pass or jump-out any safety device or switch.**

4.1 Factory-Supplied Accessories

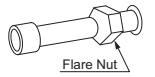
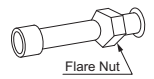
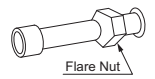
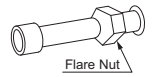
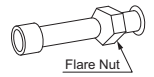
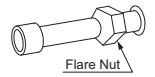
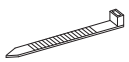
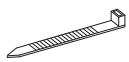
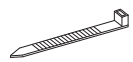
Check to ensure that the following accessories are packed with the Change-Over Box.

NOTE

If any of these accessories are not packed with the unit, please contact your distributor.

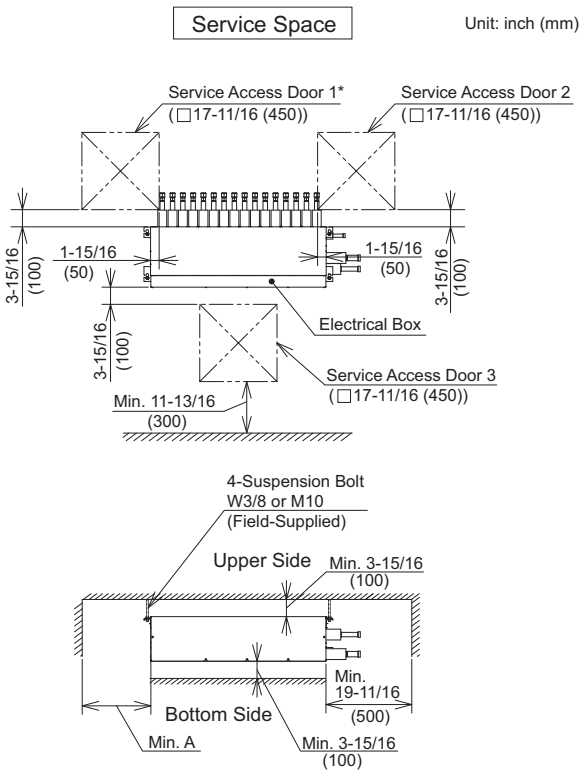
Table 4.1 Factory-Supplied Accessories

inch (mm)

No.	Accessory		COB04M132B22S	Qty.	COB08M264B22S	Qty.	COB12M264B22S	Qty.
(1)	Accessory Pipe	ID ϕ1/2 (ϕ12.7) → Flaring ϕ5/8 (ϕ15.88)		4		8		12
(2)		ID ϕ1/4 (ϕ6.35) → Flaring ϕ3/8 (ϕ9.52)		4		8		12
(3)		ID ϕ3/4 (ϕ19.05) → Flaring ϕ5/8 (ϕ15.88)		2		2		2
(4)		ID ϕ7/8 (ϕ22.2) → Flaring ϕ5/8 (ϕ15.88)		1		2		2
(5)		ID ϕ7/8 (ϕ22.2) → OD ϕ1 (ϕ25.4)		1	-	-	-	-
(6)		ID ϕ1-1/8 (ϕ28.58) → OD ϕ1 (ϕ25.4)	-	-	-	-		1
(7)	Insulation Material	ID ϕ1 (ID ϕ26)		4		8		12
(8)		ID ϕ1-3/8 (ID ϕ35)		4		8		12
(9)	Clamp			17		34		51

4.2 Initial Check

- Install the Change-Over Box with a proper clearance around it for maintenance working space, as shown in Figure 4.1 below.



* Service access door 1 is required for models COB08M264B22S and COB12M264B22S.

Model \ Size	A
COB04M132B22S	Min. 3-15/16 (100)
COB08M264B22S	Min. 15-3/4 (400)
COB12M264B22S	

Purpose of Each Service Access Door

Name	Purpose
Service Access Door 1	Use during inspection of indoor unit connecting side.
Service Access Door 2	Use during inspection of indoor unit connecting side.
Service Access Door 3	Use during inspection of electrical components inside electrical box.

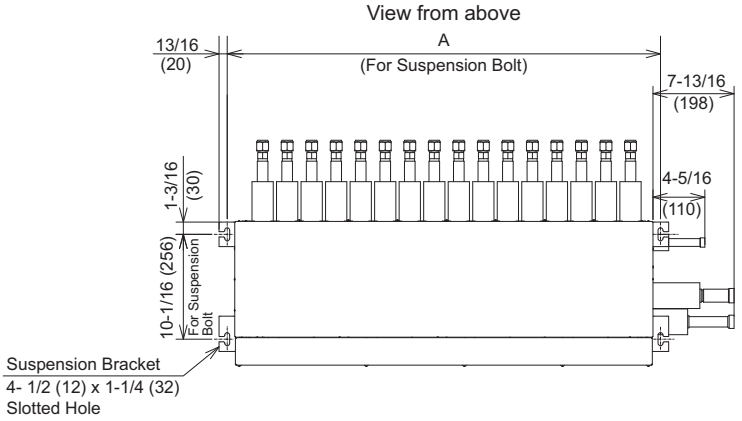
Figure 4.1 Service Space

- Check to ensure that the ceiling is sufficiently strong to sustain the Change-Over Box. If the ceiling is weak, abnormal sound and vibration may occur.
- When the electronic expansion valve in the Change-Over Box is activated, sounds may be produced from the Change-Over Box. Take the following action to minimize the sound.
  - (A) Install the Change-Over Box inside the ceiling. As for the ceiling material, select a material like a plasterboard at least 1 inch (9mm), which minimizes operation sound.
  - (B) Do not install the Change-Over Box in a place near bedrooms or hospital rooms.
- When the operation is changed to cooling/heating mode, a change in the typical refrigerant flow sounds may be heard or perceived from the Change-Over Box.
  Therefore, install the Change-Over Box in the ceiling of the corridor so that the refrigerant flowing sound may not be heard in the room.
- Do not install the Change-Over Box in a hot or humid place, such as a kitchen, to prevent condensation on the outer surface of the Change-Over Box.
  When installing the Change-Over Box in such places, apply additional insulation.
- Pay attention to the following points when the Change-Over Box is installed in a hospital or other facility where there are electronic waves from medical equipment.
  - (A) Do not install the Change-Over Box where the electromagnetic wave is directly radiated to the electrical box or communication cable.
  - (B) Install the Change-Over Box and components as far as practicable or at least 10 ft (3m) from the electromagnetic wave radiator.
  - (C) Install a noise filter when the power supply emits harmful noises.
- For more details of the refrigerant piping and height limitations, refer to the Installation and Maintenance Manual for the Outdoor Unit.
- Ensure the installation place is convenient for the refrigerant piping or electrical wiring connection.
- Do not drill, or drive screws into the cabinet. Use only mounting points provided.
- In case the Change-Over Box has to be replaced after installation, provide a large enough service door to accommodate the unit.

4.3 Suspension Bolts

4.3.1 Location of Suspension Bolts

(1) Select a final location and installation direction of the Change-Over Box.
Pay careful attention to the space for the piping, wiring and maintenance.
For more details of the refrigerant piping and height limitations, refer to the Installation and Maintenance Manual for the Outdoor Unit.
(2) Mount suspension bolts.
(3) Contact a qualified contractor or carpenter for the ceiling or structure work.



Unit: inch(mm)

Model \ Size	A
COB04M132B22S	13-3/8 (340)
COB08M264B22S	22-13/16 (580)
COB12M264B22S	32-5/16 (820)

Figure 4.2 Location of Suspension Bolts

4.3.2 Installing Suspension Bolts

Mount suspension bolts, as shown in Figure 4.3.

1. Reinforce the designated opening in the false ceiling area. Use approved materials of sufficient tensile strength to allow for quality installation.
2. Strengthen suspension bolts with support plates as required in preparation for an earthquake. (Refer to the Safety Section for more information.)
Use field-supplied M10 suspension bolts and support plates.

For Wooden Beam	For Concrete Slab
Install the unit to the tie beam (for single-storied building) or to the second floor girder (for two-storied building), and use sufficiently strong squared timber as shown below.	Install suspension bolts so that it can withstand the unit weight load.

inch (mm)

Interval between Beams	Squared Timber
≤ 35-7/16 (900)	2-3/8 (60) square
≤ 70-7/8 (1800)	3-9/16 (90) square

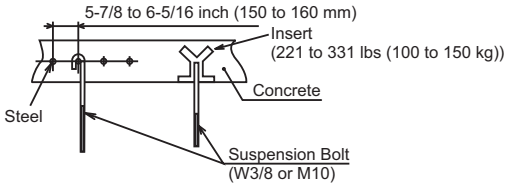


Figure 4.3 Mounting of Suspension Bolts

4.4 Installation

4.4.1 Marking of the Positions of the Suspension Bolts and Wiring Connections

(1) Mark the positions of the suspension bolts, refrigerant piping connections and wiring connection.

(2) Installation dimensions are shown in Figure 2.1 and 2.2.

4.4.2 Mounting and Hanging the Change-Over Box

(1) Place nuts and washers onto the suspension bolts before installing the Change-Over Box.

NOTE:
Make sure to use washers for installing the suspension bolts to the suspension brackets. Install the washer with the insulation side facing down for suspended installation applications. This way, the washers themselves remain in position on the suspension bolts during the installation phase.

Field-Supplied Parts

* Suspension Bolt:	4-W3/8 or M10
* Nut:	12-W3/8 or M10
* Washer:	4-W3/8 or M10
* Washer with Insulation:	4-W3/8 or M10

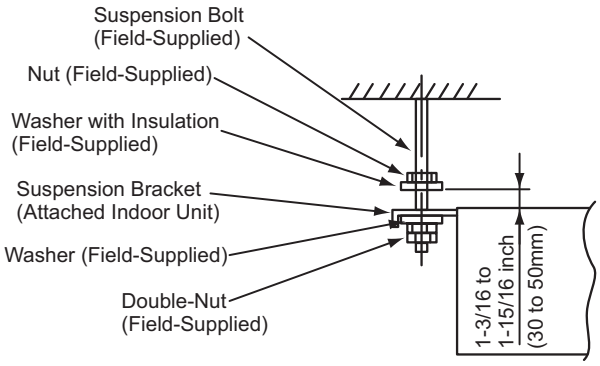


Figure 4.4 Suspension

(2) Hanging the Change-Over Box

(a) Hang the Change-Over Box by putting hands on the bottom of the cabinet.

(b) Insert the suspension bolt into the groove part of the suspension bracket as shown in Figure 4.5. Ensure that the washers are correctly affixed to the suspension bracket.

(c) After properly installing the Change-Over Box, ensure that all piping and wiring connections are correct before proceeding.
For more details of the refrigerant piping and height limitations, refer to the Installation and Maintenance Manual for the Outdoor Unit.

(d) Keep the Change-Over Box level to the ceiling surface. If the Change-Over Box is not level, a malfunction may occur.

(e) Tighten the nuts of the suspension bolt with the suspension bracket after adjustment is completed.
Adhesive must be applied to the nuts in order to prevent them from loosening.

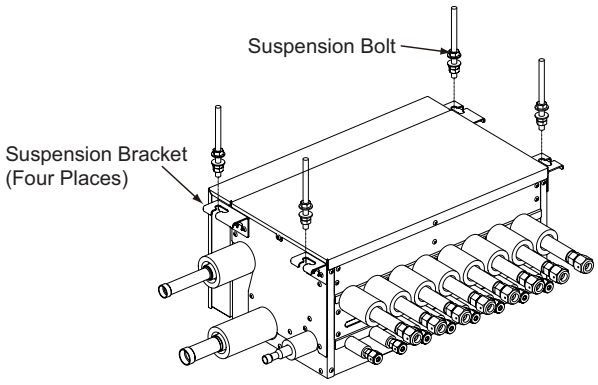


Figure 4.5 Hanging Method

5. Refrigerant Piping Work

⚠ DANGER

Use the specified non-flammable refrigerant (R410A) for the outdoor unit in the refrigerant cycle. Do not charge material other than R410A into the unit such as hydrocarbon refrigerants (propane or something similar), oxygen, flammable gases (acetylene or etc.) or poisonous gases when installing, maintaining and moving. These flammables are extremely dangerous and may cause an explosion, a fire, and injury.

⚠ CAUTION

For more details of the refrigerant piping and height limitations, refer to the Installation and Maintenance Manual for the Outdoor Unit.

5.1 Refrigerant Piping

(1) Prepare locally-supplied copper pipes.

(2) Select clean copper tubes making sure there is no dust or moisture inside the tubes. Before connecting pipes, blow the inside of the tubes with nitrogen or dry air, to remove any dust or foreign materials.

(3) Select the piping size as shown in the tables below. Furthermore, check for the flare nut and flaring dimension according to the following figure and table.

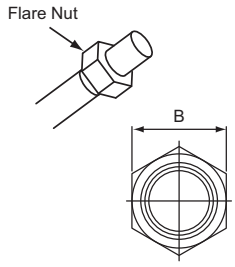
- Copper Coupling Selection
  If hard temper pipe is used, the flaring work cannot be performed. In this case, use a copper coupling selected from the table below.

Minimum Thickness inch (mm)

Diameter	R410A
1/4 (6.35)	0.020 (0.5)
3/8 (9.52)	0.024 (0.6)
1/2 (12.7)	0.028 (0.7)
5/8 (15.88)	0.031 (0.8)
3/4 (19.05)	0.031 (0.8)
7/8 (22.2)	0.035 (0.9)
1-1/8 (28.58)	0.039 (1.0)
1-5/8 (41.28)	0.057 (1.45)

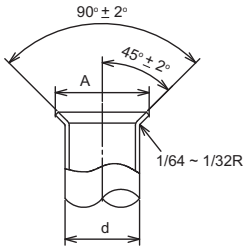
Flare Nut Dimension B inch (mm)

Diameter	R410A
1/4 (6.35)	11/16 (17)
3/8 (9.52)	7/8 (22)
1/2 (12.7)	1 (26)
5/8 (15.88)	1-1/8 (29)
3/4 (19.05)	1-7/16 (36)



NOTE:
Do not use a copper coupling other than those specified in the table above.

- Flaring Dimension
  Perform the flaring work as shown below.



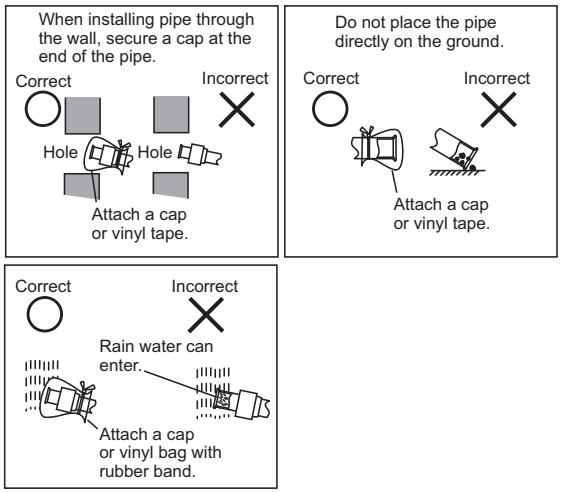
inch (mm)

Diameter (ϕd)	A +0 -0.02 (-0.4)
	R410A
1/4 (6.35)	0.36 (9.1)
3/8 (9.52)	0.52 (13.2)
1/2 (12.7)	0.65 (16.6)
5/8 (15.88)	0.78 (19.7)
3/4 (19.05)	(✳)

(✳) If it is not possible to form the correct flare with 3/4 inch material then use an accessory pipe (with a flare).

NOTICE

- **Cautions for Refrigerant Pipe Work (Example)**



- Cautions for Piping Connection Work

(a) Install the refrigerant piping between the indoor and outdoor units. Ensure piping does not touch ceiling and walls. Otherwise, an abnormal sound may be heard from the vibration of the piping.

(b) Apply refrigerant oil in a thin layer over the flared part before the flaring work. Then tighten the flare nut with the specified tightening torque using two wrenches. Always use a back-up wrench to prevent twisting of the copper piping within the unit assembly. Perform the flaring work on the liquid piping side before the gas piping side. Check for gas leakage after flaring work.

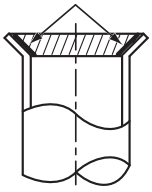
NOTE:
Refrigerant oil is field-supplied.
[Ethereal Oil FVC50K, FVC68D (Idemitsu Kousan Co. Ltd.)]

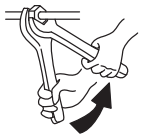
(c) When temperature and humidity inside the ceiling exceed 80°F(27°C) /RH, relative humidity, 80%, apply additional insulation approximately 13/16 inch (20mm) thickness to the accessory insulation. It prevents condensation on the surface of the insulation (refrigerant pipe only) and possible damage to electronic components.

(d) Perform the leakage test 601 psi (4.15MPa) for the test pressure. Refer to the Installation and Maintenance Manual for the Outdoor Unit for more details.

(e) Perform thermal insulation work by insulating and taping the flare connection and reducer connection. Also insulate all the refrigerant pipes.

Apply Refrigerant Oil.





Two wrenches required to prevent damaging the copper piping.

Required Tightening Torque

Pipe Size	Tightening Torque
ϕ1/4 inch (6.35mm)	10.3 to 13.3 ft·lbs (14 to 18 N•m)
ϕ3/8 inch (9.52mm)	25.1 to 31.0 ft·lbs (34 to 42 N•m)
ϕ1/2 inch (12.7mm)	36.1 to 45.0 ft·lbs (49 to 61 N•m)
ϕ5/8 inch (15.88mm)	50.2 to 60.5 ft·lbs (68 to 82 N•m)
ϕ3/4 inch (19.05mm)	73.8 to 88.5 ft·lbs (100 to 120 N•m)

⚠CAUTION

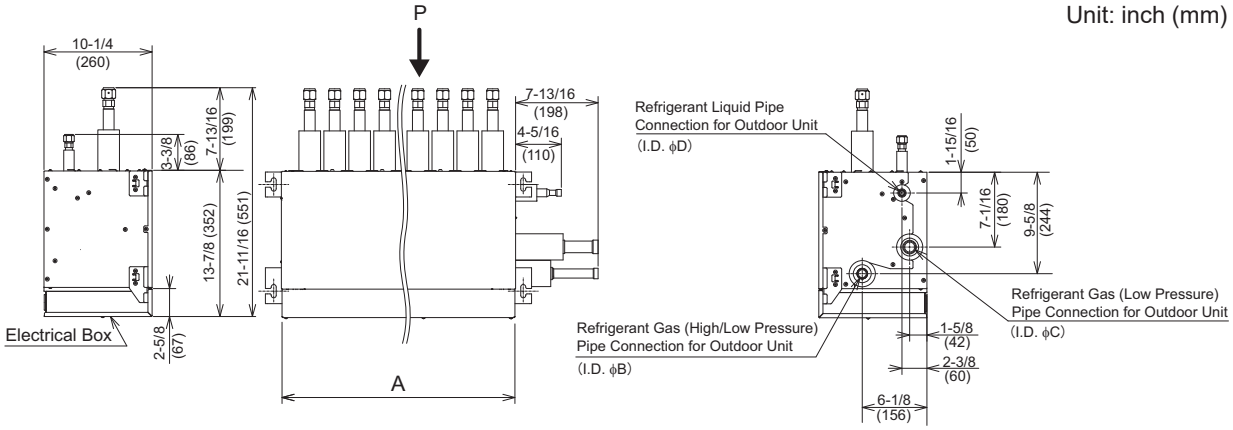
- **Do not apply excessive force to the flare nut when tightening. Excessive force can result in the flare nut cracking and refrigerant leakage may occur. Use the specified tightening torque.**
- **For more details of the refrigerant piping work, vacuum pumping and refrigerant charge, refer to the Installation and Maintenance Manual for the Outdoor Unit.**

5.2 Refrigerant Piping Work

Provide the refrigerant pipe in the field.
Make sure that the refrigerant pipe is connected to the same refrigerant cycle unit.

(1) Position of Piping Connection

Unit: inch (mm)

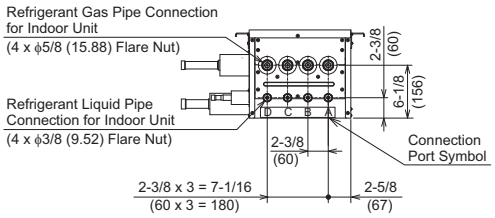


Model \ Dimension	A	B	C	D
COB04M132B22S	11-15/16 (303)	7/8 (22.2)	1 (25.4) [1]	1/2 (12.7)
COB08M264B22S	21-3/8 (543)	7/8 (22.2)	1-1/8 (28.58)	1/2 (12.7)
COB12M264B22S	30-13/16 (783)	1 (25.4) [2]	1-1/8 (28.58)	5/8 (15.88)

1. Ensure to apply reducer (accessory pipe) for changing the pipe size to ϕ7/8 inch (22.2mm) for field pipe connection.
2. Ensure to apply reducer (accessory pipe) for changing the pipe size to ϕ1-1/8 inch (28.58mm) for field pipe connection.

View of Indoor Unit Connecting Side from P

COB04M132B22S



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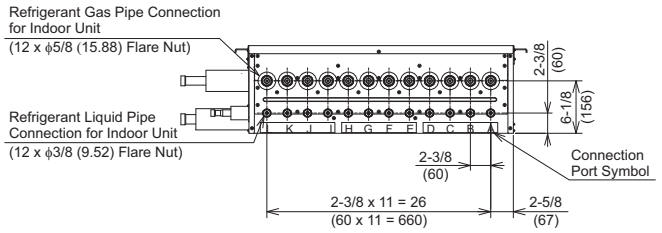

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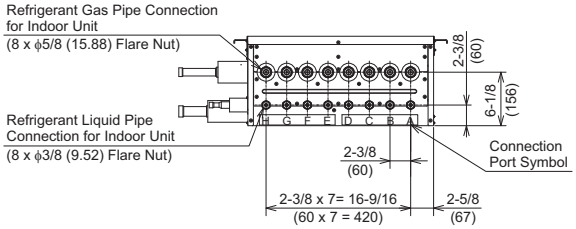
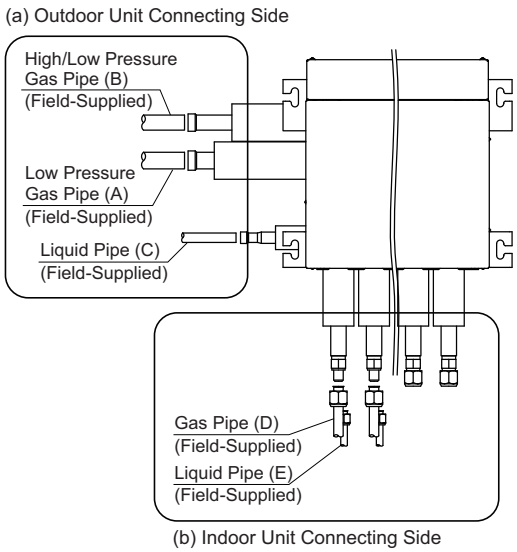


(2) Selecting Piping Size

- Select the size for the high/low pressure gas pipe, low pressure gas pipe and liquid pipe according to Table 5.1. The size depends on the indoor unit total capacity connected downstream of the Change-Over Box.
- As for the multi-kit branch or header branch, refer to the Installation and Maintenance Manual for the Outdoor Unit.
- Perform the piping connection work for the Change-Over Box as shown below.



(a) Outdoor Unit Side Field Piping Size

Table 5.1 Outdoor Unit Side Field Piping Size

Connected Indoor Unit Capacity	Low Pressure Gas Pipe (A)	High/Low Pressure Gas Pipe (B)	Liquid Pipe (C)
MBH	inch (mm)	inch (mm)	inch (mm)
47 or less	ϕ5/8 (15.88)	ϕ1/2 (12.7)	ϕ3/8 (9.52)
48 to 71	ϕ3/4 (19.05)	ϕ5/8 (15.88)	ϕ3/8 (9.52)
72 to 95	ϕ7/8 (22.2)	ϕ3/4 (19.05)	ϕ3/8 (9.52)
96 to 119	ϕ7/8 (22.2)	ϕ3/4 (19.05)	ϕ1/2 (12.7)
120 to 143	ϕ1-1/8 (28.58)	ϕ7/8 (22.2)	ϕ1/2 (12.7)
144 to 215	ϕ1-1/8 (28.58)	ϕ7/8 (22.2)	ϕ5/8 (15.88)
216 to 264	ϕ1-3/8 (34.93)	ϕ1-1/8 (28.58)	ϕ3/4 (19.05)

NOTE:
Refer to “Position of Piping Connection” for the details of the piping connection for the Change-Over Box. Use field-supplied reducer in case the field piping and Change-Over Box piping connection does not match.

Details of changes to the piping size for connection to the Change-Over Box are shown below.

COB04M132B22S

Unit: inch (mm)

	Piping Connection Size for Change-Over Box	Required Pipe Size	Accessory	Field-Supplied	Remarks
Low Pressure Gas Pipe (A)	ϕ1 (25.4)	ϕ5/8 (15.88)	OD1 (25.4)→ ID7/8 (22.2) (Apply (5) accessory to piping connection)	OD7/8 (22.2) → ID5/8 (15.88)	Apply Field-Supplied Reducer (2 Size Down)
		ϕ3/4 (19.05)		OD7/8 (22.2) → ID3/4 (19.05)	Apply Field-Supplied Reducer
		ϕ7/8 (22.2)		-	-
		ϕ1-1/8 (28.58)		OD7/8 (22.2) → ID1-1/8 (28.58)	Apply Field-Supplied Reducer (2 Size Up)
High/Low Pressure Gas Pipe (B)	ϕ7/8 (22.2)	ϕ1/2 (12.7)	-	OD7/8 (22.2) → ID1/2 (12.7)	Apply Field-Supplied Reducer (3 Size Down)
		ϕ5/8 (15.88)	-	OD7/8 (22.2) → ID5/8 (15.88)	Apply Field-Supplied Reducer (2 Size Down)
		ϕ3/4 (19.05)	-	OD7/8 (22.2) → ID3/4 (19.05)	Apply Field-Supplied Reducer
		ϕ7/8 (22.2)	-	-	-
Liquid Pipe (C)	ϕ1/2 (12.7)	ϕ3/8 (9.52)	-	OD1/2 (12.7) → ID3/8 (9.52)	Apply Field-Supplied Reducer
		ϕ1/2 (12.7)	-	-	-

COB08M264B22S

Unit: inch (mm)

	Piping Connection Size for Change-Over Box	Required Pipe Size	Accessory	Field-Supplied	Remarks
Low Pressure Gas Pipe (A)	ϕ1-1/8 (28.58)	ϕ5/8 (15.88)	-	OD1-1/8 (28.58) → ID5/8 (15.88)	Apply Field-Supplied Reducer (4 Size Down)
		ϕ3/4 (19.05)	-	OD1-1/8 (28.58) → ID3/4 (19.05)	Apply Field-Supplied Reducer (3 Size Down)
		ϕ7/8 (22.2)	-	OD1-1/8 (28.58) → ID7/8 (22.2)	Apply Field-Supplied Reducer (2 Size Down)
		ϕ1-1/8 (28.58)	-	-	-
		ϕ1-3/8 (34.93)	-	OD1-1/8 (28.58) → ID1-3/8 (34.93)	Apply Field-Supplied Reducer
High/Low Pressure Gas Pipe (B)	ϕ7/8 (22.2)	ϕ1/2 (12.7)	-	OD7/8 (22.2) → ID1/2 (12.7)	Apply Field-Supplied Reducer (3 Size Down)
		ϕ5/8 (15.88)	-	OD7/8 (22.2) → ID5/8 (15.88)	Apply Field-Supplied Reducer (2 Size Down)
		ϕ3/4 (19.05)	-	OD7/8 (22.2) → ID3/4 (19.05)	Apply Field-Supplied Reducer
		ϕ7/8 (22.2)	-	-	-
		ϕ1-1/8 (28.58)	-	OD7/8 (22.2) → ID1-1/8 (28.58)	Apply Field-Supplied Reducer (2 Size Up)
Liquid Pipe (C)	ϕ1/2 (12.7)	ϕ3/8 (9.52)	-	OD1/2 (12.7) → ID3/8 (9.52)	Apply Field-Supplied Reducer
		ϕ1/2 (12.7)	-	-	-
		ϕ5/8 (15.88)	-	OD1/2 (12.7) → ID5/8 (15.88)	Apply Field-Supplied Reducer
		ϕ3/4 (19.05)	-	OD1/2 (12.7) → ID3/4 (19.05)	Apply Field-Supplied Reducer (2 Size Up)

COB12M264B22S

Unit: inch (mm)

	Piping Connection Size for Change-Over Box	Required Pipe Size	Accessory	Field-Supplied	Remarks
Low Pressure Gas Pipe (A)	ϕ1-1/8 (28.58)	ϕ3/4 (19.05)	-	OD1-1/8 (28.58) → ID3/4 (19.05)	Apply Field-Supplied Reducer (3 Size Down)
		ϕ7/8 (22.2)	-	OD1-1/8 (28.58) → ID7/8 (22.2)	Apply Field-Supplied Reducer (2 Size Down)
		ϕ1-1/8 (28.58)	-	-	-
		ϕ1-3/8 (34.93)	-	OD1-1/8 (28.58) → ID1-3/8 (34.93)	Apply Field-Supplied Reducer
High/Low Pressure Gas Pipe (B)	ϕ1 (25.4)	ϕ5/8 (15.88)	OD1 (25.4)→ID1-1/8 (28.58) (Apply (6) accessory to piping connection)	OD1-1/8 (28.58) → ID5/8 (15.88)	Apply Field-Supplied Reducer (4 Size Down)
		ϕ3/4 (19.05)		OD1-1/8 (28.58) → ID3/4 (19.05)	Apply Field-Supplied Reducer (3 Size Down)
		ϕ7/8 (22.2)		OD1-1/8 (28.58) → ID7/8 (22.2)	Apply Field-Supplied Reducer (2 Size Down)
		ϕ1-1/8 (28.58)		-	-
Liquid Pipe (C)	ϕ5/8 (15.88)	ϕ3/8 (9.52)	-	OD5/8 (15.88) → ID3/8 (9.52)	Apply Field-Supplied Reducer (2 Size Down)
		ϕ1/2 (12.7)	-	OD5/8 (15.88) → ID1/2 (12.7)	Apply Field-Supplied Reducer
		ϕ5/8 (15.88)	-	-	-
		ϕ3/4 (19.05)	-	OD5/8 (15.88) → ID3/4 (19.05)	Apply Field-Supplied Reducer

(b) Indoor Unit Side Field Piping Size

- When a branch is located downstream of the Change-Over Box

Connected Indoor Unit Capacity	Gas Pipe (D)	Liquid Pipe (E)
MBH	inch (mm)	inch (mm)
41 or less	ϕ5/8 (15.88) [1]	ϕ3/8 (9.52) [1]

1. Field flaring work is required. Refer to Section 5.1 for the flaring work.

- When a branch is not located downstream of the Change-Over Box

Connected Indoor Unit Capacity	Gas Pipe (D)	Liquid Pipe (E)	Remarks
MBH	inch (mm)	inch (mm)	
6 to 15	ϕ1/2 (12.7)	ϕ1/4 (6.35)	Use accessory pipe (1) on gas pipe side and accessory pipe (2) on liquid pipe side to decrease the pipe size.
18 to 54	ϕ5/8 (15.88) [1]	ϕ3/8 (9.52) [1]	-
60 to 72	ϕ3/4 (19.05)	ϕ3/8 (9.52) [1]	Use accessory pipe (3) on gas pipe side to increase the pipe size.
96	ϕ7/8 (22.2)	ϕ3/8 (9.52) [1]	Use accessory pipe (4) on gas pipe side to increase the pipe size.

1. Field flaring work is required. Refer to Section 5.1 for the flaring work.

NOTES:

1. When connecting the Gas Pipe (D) and Liquid Pipe (E), reuse the flare nut attached to the Change-Over Box.
2. When the connected indoor unit capacity is 6~17MBH and the piping length exceeds 49ft. (15m), use 3/8 inch (9.52mm) for the liquid pipe.

NOTICE

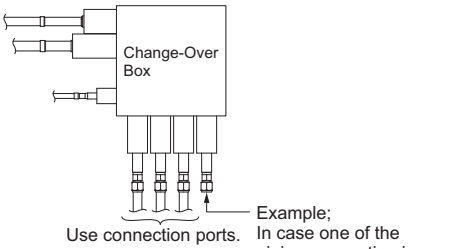
In case the piping connection is not used for the indoor unit side piping connection, it must be sealed using the closed flare nut originally attached. These flare nuts have been tightened by torque specifications shown below before shipping. Ensure that they are sealed completely.

● Tightening Torque for Flare Nut before shipping

Item	Tightening Torque
Gas Pipe Flare Nut	55.3±5 ft·lbs (75±7 N·m)
Liquid Pipe Flare Nut	28.0±3 ft·lbs (38±4 N·m)

NOTICE

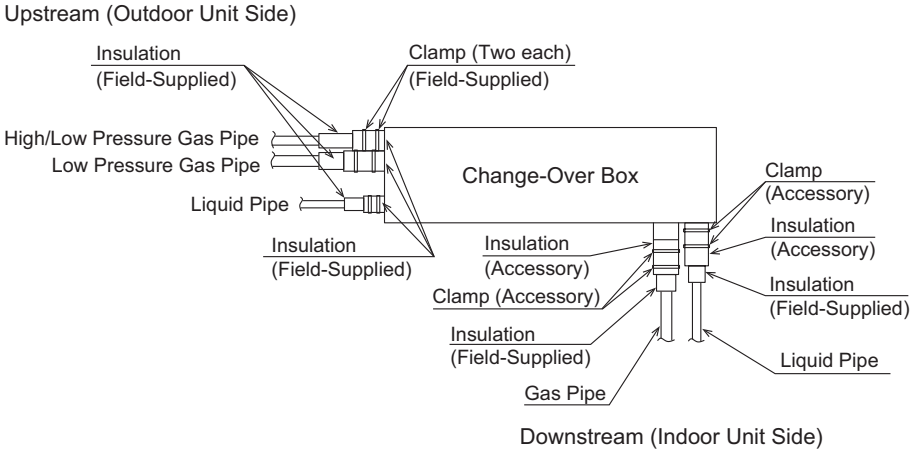
1. **In case of 60, 72 or 96 type indoor unit connection:**
   - **Up to two 60, 72 or 96 type indoor units can be connected to the Change-Over Box within the "Maximum Total Capacity of All Connected Indoor Units". Make sure to increase the pipe connection size by using the appropriate accessory pipe.**
   - **Only single unit per branch is allowed to be connected.**
2. **In case the number of indoor unit connection is less and the piping connections are left over:**
   - **Unused piping connections must be remain sealed using the closed flare nut originally attached. It is unnecessary to attach closed-end piping. Refrigerant leakage is caused by loosened flare nuts. Ensure that they are sealed completely. Use specified tightening torque according to the table "Tightening Torque for Flare Nut before shipping" above.**
   - **Any piping connections can be left over. However, both gas and liquid piping of connection port symbol must match.**
3. **In case there is a plan for additional indoor units in the future:**
   - **Do not plan the piping size for additional indoor units. Ensure to select the piping again in the future.**
   - **Additional indoor units can be connected only after the refrigerant is recovered.**



Above figure illustrate the example of COB04M132B22S.

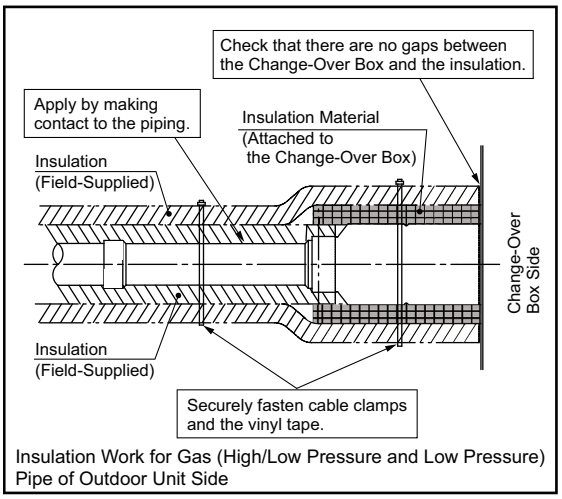
(3) Piping Insulation

(a) After the air-tight leakage test, perform insulation work as shown below.

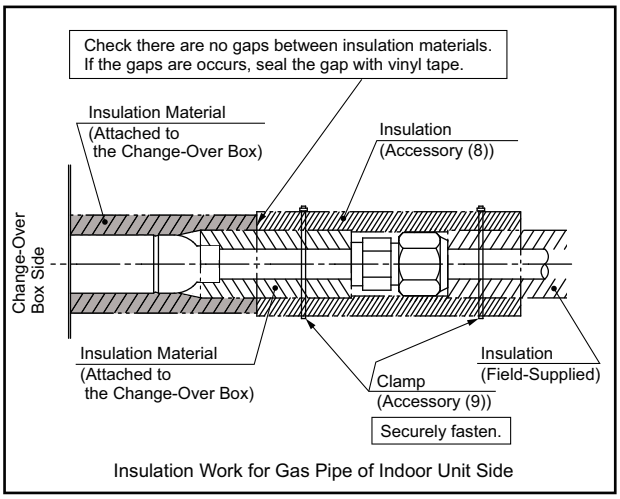


(b) Insulate gas and liquid pipe separately using the accessory insulation material.
In the event that temperature and humidity levels inside the ceiling exceed 80°F (27°C)/RH, relative humidity 80%, apply additional insulation materials (approximately 3/8 inch (10mm) thickness) to the surface of the accessory insulation material to avoid condensation.

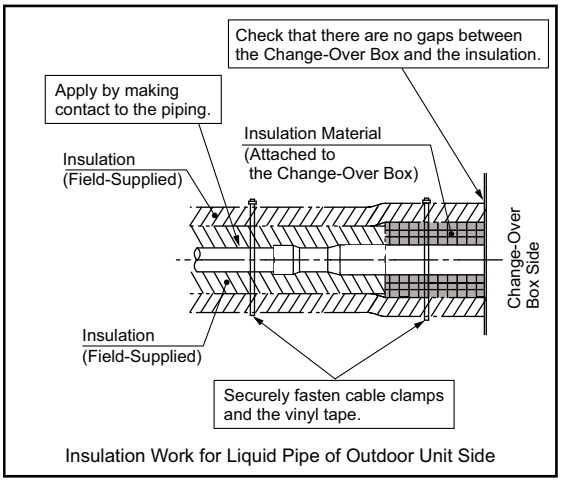
(c) Perform insulation work by insulating and taping the flare connection and reducer connection.
Also insulate all the refrigerant pipes.



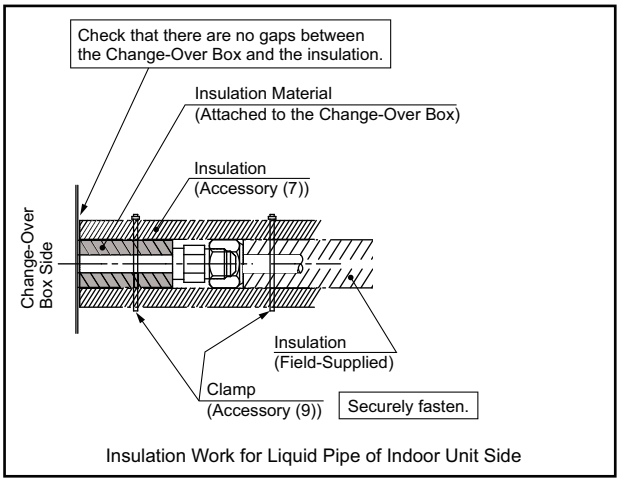
Insulation Work for Gas (High/Low Pressure and Low Pressure) Pipe of Outdoor Unit Side



Insulation Work for Gas Pipe of Indoor Unit Side

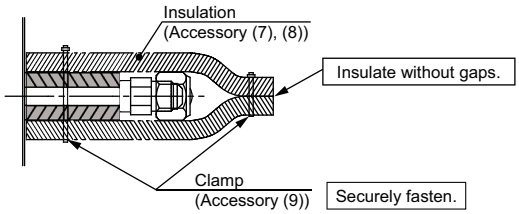


Insulation Work for Liquid Pipe of Outdoor Unit Side



Insulation Work for Liquid Pipe of Indoor Unit Side

(d) In case there are unused piping connections, ensure to apply accessory insulation material to the piping and flare connections without gaps as shown on the right figure. (For gas and liquid sides)



NOTE:
The accessory numbers are listed in Table 4.1.

6. Electrical Wiring

⚠WARNING

- **LOCK ALL ELECTRICAL POWER SUPPLY SWITCHES IN THE OFF POSITION BEFORE INSTALLING THE UNIT. FAILURE TO DISCONNECT POWER SUPPLY MAY RESULT IN ELECTRICAL SHOCK OR DEATH.**
- **Turn off the main power switch to the Change-Over Box, the indoor unit and the outdoor unit before electrical wiring work or a periodical check is performed.**
- **Insulate all wiring, condensate piping and electrical components from extreme temperatures and burring animals. Failure to do so can over time, deteriorate system performance.**
- **Power wiring to the equipment must conform to National and Local Codes (NEC) and be installed by a professional electrician. Provide each unit with its own separate electrical circuit, means of circuit protection, and electrical disconnect switch. Follow current National Electrical Code ANSI/ NFPA 70, CSA C22.1 C.E.C. Part 1, and state and local codes. Failure to provide these shut-off means could cause electrical shock or fire, resulting in damage, injury or death.**
- **Secure all wire connections, outside forces on the terminals may cause fire.**
- **Be sure to attach the cover so that it fits securely on the electrical box without any gaps. Secure the cover with screws.**
- **Tighten screws according to the following torque.**
  M4: 0.7 to 1.0 ft·lbs (1.0 to 1.3 N·m) (TB1, TB2, TB3, TB4)

⚠CAUTION

- **Wrap the field-supplied insulation around the wires, and plug the wiring connection opening with sealing material to protect the product from any condensate water or insects.**
- **Tightly secure the wires with the cable clamp inside the Change-Over Box.**
- **Do not connect the ground wiring to the gas pipe, condensate pipe or lightning conductor.**
  Gas pipe: An explosion and ignition may occur when gas leaks.
  Water pipe: There is no ground when a hard vinyl pipe is used.
  Lightning conductor: The ground potential abnormally increases when a lightning conductor is used.

6.1 General Check

(1) Make sure that the field-selected electrical components (main switches, fuses, GFCI (Ground Fault Circuit Interrupter), wires, conduit connectors and wire terminals) are properly selected according to the electrical data indicated in Table 6.1. Make sure that the components comply with National Electrical Code (NEC).

(2) Communication cable must be a minimum of 18-Gauge, 2-Conductor, Stranded Copper. Shielded cable must be considered for applications and routing in areas of high EMI and other sources of potentially excessive electrical noise to reduce the potential for communication errors. When shielded cabling is applied, proper bonding and termination of the cable shield is required as per Johnson Controls-Hitachi Air Conditioning guidelines. Plenum and riser ratings for communication cables must be considered per application and local code requirements.

(3) Use shielded communication cable for communication cable between the indoor and the outdoor unit (Max. 3,281 ft (1,000m)), and connect the shielded part to the ground screw in the electrical box.

(4) Make sure that the power supply voltage is within ±10% of the rated voltage.

(5) Check the capacity of the electrical wiring. If the power supply wiring capacity is too low, the system cannot be started due to the voltage drop.

(6) Make sure that the ground wiring is connected.

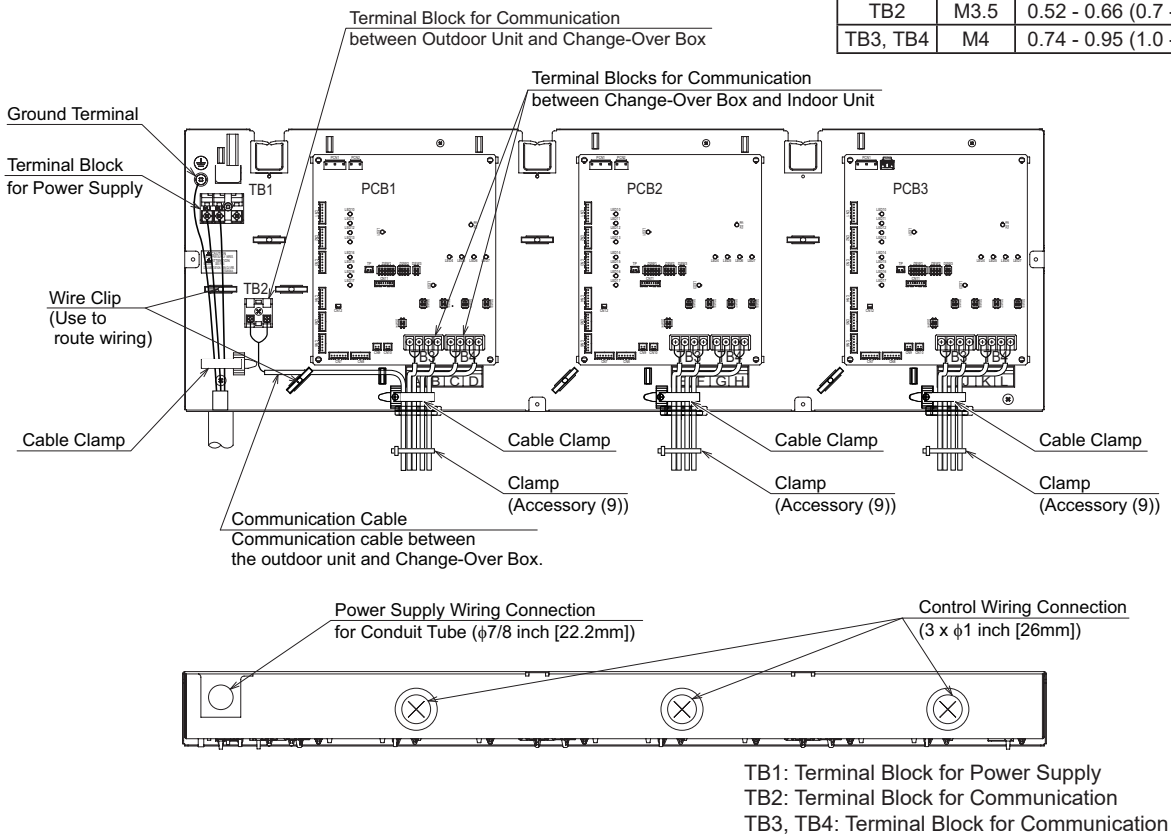
6.2 Electrical Wiring

The electrical wiring connection for the Change-Over Box is shown in Figure 6.1.

(1) Turn OFF the main power switch and take off the electrical box cover of Change-Over Box.
(2) Connect the power supply wiring to terminals L1 and L2 on the terminal block TB1, and connect ground wiring to the ground terminal in the electrical box.
(3) Connect the communication cable between the outdoor unit and Change-Over Box to TB2 of the Change-Over Box.
Connect the communication cable between the Change-Over Box and indoor unit to TB3 and TB4 of the Change-Over Box.
Ensure that the communication cable between the Change-Over Box and indoor unit is connected to the same letter as piping connection. (Tightening Torque: 0.7 to 1.0 ft·lbs (1.0 to 1.3 N·m))
Refer to “Example of Electrical Wiring” for the wiring connection.
(4) Tightly clamp the wires using the cable clamp inside the electrical box.
(5) Make sure the communication cables outside the electrical box does not touch sharp edges by securing with clamp (accessory (9)).
(6) Attach the electrical box cover after completing the wiring work.

Tightening Torque

Terminal Block	Screw Size	Tightening Torque [ft·lbs (N·m)]
TB1	M4	0.74 - 0.95 (1.0 - 1.3)
TB2	M3.5	0.52 - 0.66 (0.7 - 0.9)
TB3, TB4	M4	0.74 - 0.95 (1.0 - 1.3)



TB1: Terminal Block for Power Supply
TB2: Terminal Block for Communication
TB3, TB4: Terminal Block for Communication

Above figure illustrate the example of COB12M264B22S.
Number of PCBs are different depending on model number.
Refer to the following table.

	PCB1	PCB2	PCB3
COB04M132B22S	○	×	×
COB08M264B22S	○	○	×
COB12M264B22S	○	○	○

NOTE:
The accessory numbers are listed in Table 4.1.

Figure 6.1 Electrical Wiring Connection

6.3 Electrical Wiring Connection

(1) Perform the electrical wiring work for the Change-Over Boxes. Select the wire size according to the table below.

(2) Pay attention to the marks on the terminal block when connecting wires for Change-Over Box and I.U./O.U. Refer to “Example of Electrical Wiring” for the wiring connection on the next page. (Connection port symbol and indoor unit symbol must match.)

Table 6.1 Electrical Data and Recommended Wiring, Breaker Size

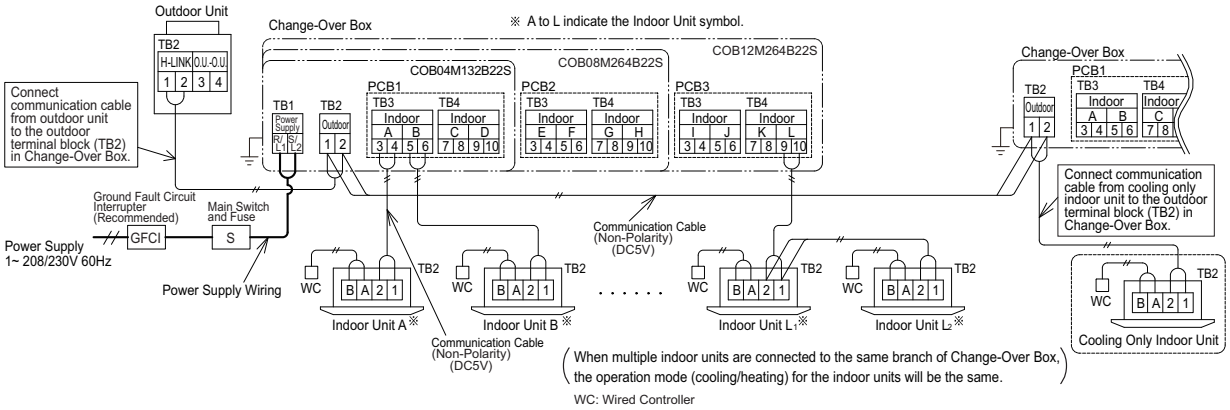
Model	Power Supply	Minimum Wire Thickness [AWG (mm^2)]				Ground Fault Circuit Interrupter Breaker		Main Switch		MCA (Minimum Circuit Ampacity)
		Power Supply Wiring Size		Ground Wiring Size	Commu-nication Cable Size	Nominal Current	Nominal Sensitive Current	Nominal Current	Fuse	
		Main	Branch			[A]	[mA]	[A]	[A]	[A]
COB04M132B22S	1~, 208/230V 60Hz	14 (2.1)	18 (0.82)	18 (0.82)	18 (0.82)	15	30	15	15	0.2
COB08M264B22S										0.4
COB12M264B22S										0.6

NOTES:

1. Follow local codes and regulations when selecting field wires.
2. When shielded communication cable is utilized, connect the shield to an earth ground at the outdoor unit only. The shield must be kept continuous at each connection point (change-over box or indoor unit) and only grounded at one single point (ODU earth ground). Communication cable must be a minimum of 18-Gauge, 2-Conductor, Stranded Copper. Shielded cable must be considered for applications and routing in areas of high EMI and other sources of potentially excessive electrical noise to reduce the potential for communication errors. When shielded cabling is applied, proper bonding and termination of the cable shield is required as per Johnson Controls-Hitachi Air Conditioning guidelines. Plenum and riser ratings for communication cables must be considered per application and local code requirements.
3. Select the GFCI with activation speed of 0.1 sec. or less.
4. Total operating current must be less than 12A.

• Example of Electrical Wiring

The following figure shows an example of electrical wiring of the Change-Over Boxes.



NOTES:

1. Do not apply excessive voltage to the communication cable DC5V (non-polarity) between the outdoor unit and the Change-Over Box, between the Change-Over Box and the indoor unit or between Change-Over Boxes.
2. Use 2-Conductor shielded communication cable for the communication cable. (Do not use cable with three or more conductors.)
3. Connect the communication cable for the outdoor unit to terminals “1” and “2” on TB2 in the Change-Over Box.
4. Connect the communication cable for the indoor unit exclusively for cooling operation to the terminals “1” and “2” on TB2 in the Change-Over Box.
5. For Change-Over Boxes in the same refrigerant cycle, the power supply can be supplied by one main circuit.
6. Do not connect the power supply line (208/230V) to the terminal block for communication line.
7. Connect the ground wiring for the outdoor/indoor units and Change-Over Box to ensure ground resistance less than 100 ohms. Ground wiring work should be performed by a qualified electrician.
8. Do not run the communication cables next to power supply wirings in the Change-Over Box. Separate communication cables from the power supply wiring.

6.4 DIP Switch Setting

DSWs on the PCB1 are set before shipping as shown below and no setting is required.

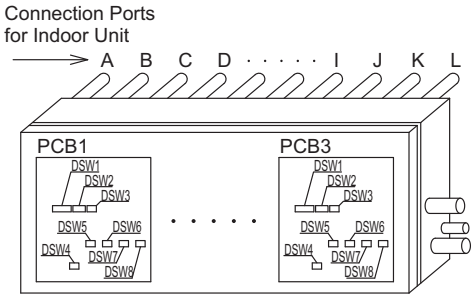


Table 6.2 Cross reference table of DIP switch settings and connection ports for indoor unit.

Models	COB04M132B22S				COB08M264B22S				COB12M264B22S			
Connection ports for indoor unit	A	B	C	D	E	F	G	H	I	J	K	L
PCB No.	PCB1				PCB2				PCB3			
DSW2 Pin No.	1	2	3	4	1	2	3	4	1	2	3	4
DSW5~8	DSW 5	DSW 6	DSW 7	DSW 8	DSW 5	DSW 6	DSW 7	DSW 8	DSW 5	DSW 6	DSW 7	DSW 8

DSW1

No setting is required

DSW2 Connection Port Setting

This setting is required.
When the connection port is not used, turn ON the applicable pin shown in the table 6.2.

(Example)
When connection port "D" is not used, turn ON DSW2-No.4 pin on PCB1.

DSW3

No setting is required

DSW4~8 Fuse Recover

If line voltage is inadvertently applied to terminals of TB2, TB3 or TB4, this will cause the non-serviceable fuse on the PCB to open. If this should occur, correct the wiring deficiency and set number one pin to the ON position for DSW4 to 8 on the PCB. This will bypass the open fuse, however no additional circuit protection is provided.

DSW4 (for TB2)

Factory Setting

Fuse Recover

DSW5~8 (for TB3 and TB4)

Factory Setting

Fuse Recover

NOTE

The "■" mark indicates the position of DIP switches. Figures show setting before shipment.

NOTICE

All indoor and outdoor units must be shut down prior to attempting to make DIP Switch adjustments, otherwise, the settings will not take effect.

7. Test Run

NOTICE

Refrigerant piping and connecting wires should be connected to the same refrigerant cycle system. If they are connected to the dissimilar refrigerant cycle systems, a malfunction may occur.

⚠WARNING

- **Special Attention Regarding Refrigerant Gas Leakage**

  Make sure that the entire VRF system meets ASHRAE Standard 15, or any local codes, regarding Safety.
  The ASHRAE Standard 15-2013 provides safeguards for life, limb, health, property, and prescribes safety requirements.
  The standard is recognized as the main guide for personal safety involving refrigeration systems. It strives to ensure a safe application of refrigerant systems by limiting the maximum charge as follows so that a complete discharge due to a leak into a small, occupied, and enclosed room can never exceed the allowable limit.

Perform a test run according to the “Installation and Maintenance Manual” of the Outdoor Unit.

⚠WARNING

- **Do not operate the system until all the check points are cleared.**
  - **(A) Check to ensure that the electrical resistance is more than 1 megohm by measuring the resistance between ground and the terminal block in the electrical box. If resistance is below 1 megohm, do not operate the system until the electrical leakage is found and repaired.**
  - **(B) Check to ensure that the stop valves of the outdoor unit are fully opened, and then start the system.**
  - **(C) Apply power to the outdoor unit(s) at least 12 hours prior to operation of the system for preheating of the compressor oil.**
- **Pay attention to the following items while the system is running.**
  - **(A) Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side may exceed 194°F (90°C).**

Table 7.1 Alarm Code

Code	Content of Abnormality	Leading Cause
03	Abnormal Communication between Indoor Units and Outdoor Units	Incorrect Wiring, Loose Terminals, Disconnected Communication Cable, Blowout of Fuse, Indoor Unit Power OFF
C1	Incorrect Change-Over Box Connection	2 or More Change-Over Boxes are Connected between Outdoor Unit and Indoor Unit
C2	Incorrect Indoor Unit Connection Number	9 or More I.U. Connected to Single Branch Type Change-Over Box, 7 or More I.U. Connected per a branch of Multiple Branch Type Change-Over Box
C3	Incorrect Indoor Unit Refrigerant Number Setting	Indoor Units of Different Refrigerant Cycle Number are Connected to Change-Over Box
C4	Incorrect Connection between Change-Over Box and Outdoor Units	This Outdoor unit is not compatible with this Change-Over Box
C5	Incorrect Connection Port Setting	Indoor Unit is connected to a port that is set to not used for Multiple Branch Type Change-Over Box

8. Safety and Control Device Setting

Change-Over Box

Model		COB04M132B22S, COB08M264B22S, COB12M264B22S
For Control Circuit Fuse	A	5

R410A QUICK REFERENCE GUIDE

Refer to Installation Instructions for specific installation requirements.

- R410A Refrigerant operates at 50-70 percent higher pressures than R22. Be sure that servicing equipment and replacement components are designed to operate with R410A.
- R410A Refrigerant cylinders are rose colored.
- Recovery cylinder service pressure rating must be 400 psig. DOT 4BA400 or DOT BW400.
- Recovery equipment must be rated for R410A.
- Do not use R410A service equipment on R22 systems. All hoses, gages, recovery cylinders, charging cylinders and recovery equipment must be dedicated for use on R410A systems only.
- Manifold sets must be at least 700 psig high side, and 180 psig low side, with 550 psig retard.
- All hoses must have a service pressure rating of 800 psig.
- Leak detectors must be designed to detect HFC refrigerants.
- Systems must be charged with refrigerant. Use a commercial-type metering device in the manifold hose.
- R410A can only be used with PVE type oils.
- Vacuum pumps will not remove moisture from POE type oils.
- Do not install suction line driers in the liquid line.
- Never open system to atmosphere when under vacuum.
- If system must be opened for service, recover and evacuate system, then break the vacuum with dry nitrogen and replace filter driers, as required.

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