

# Installation Manual for Multi-Kits

Header Branch Models: MH-NP224A, MH-NP288A

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## NOTE

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After installation, it is recommended to give this manual to customer for future reference.

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### 1. Applicable Outdoor Units

These multiple header branches can be applied to the R410A VRF systems.

### 2. Transportation

Transport this product as close to the installation site as practical before unpacking. Do not discard any foam packaging as it is used as insulation for the joint kits after pressure testing is complete.

### Important Notice

- Johnson Controls-Hitachi Air Conditioning pursues a policy of continuing improvement in design and performance in its products. As such, Johnson Controls-Hitachi Air Conditioning reserves the right to make changes at any time without prior notice.
- Johnson Controls-Hitachi Air Conditioning cannot anticipate every possible circumstance that might involve a potential hazard.
- This heat pump air conditioning unit is designed for standard air conditioning applications only. Do not use this unit for anything other than the purposes for which it was intended for.
- The installer and system specialist shall safeguard against leakage in accordance with local pipefitter and electrical codes. The following standards may be applicable, if local regulations are not available. International Organization for Standardization: (ISO 5149 or European Standard, EN 378). No part of this manual may be reproduced in any way without the expressed written consent of Johnson Controls-Hitachi Air Conditioning.
- This heat pump air conditioning unit will be operated and serviced in the United States of America and comes with a full complement of the appropriate Safety, Danger, and Caution, warnings.
- If you have questions, please contact your distributor or dealer.
- This manual provides common descriptions, basic and advanced information to maintain and service this heat pump air conditioning unit which you operate as well for other models.
- This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

### Product Inspection Upon Arrival

1. Upon receiving this product, inspect it for any damages incurred in transit. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
2. Check the model number, electrical characteristics (power supply, voltage, and frequency rating), and any accessories to determine if they agree with the purchase order.
3. The standard utilization for this unit is explained in these instructions. Use of this equipment for purposes other than what it designed for is not recommended.
4. Please contact your local agent or contractor as any issues involving installation, performance, or maintenance arise. Liability does not cover defects originating from unauthorized modifications performed by a customer without the written consent of Johnson Controls-Hitachi Air Conditioning. Performing any mechanical alterations on this product without the consent of the manufacturer will render your warranty null and void.

## Signal Words

 <b>WARNING</b>	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
<b>NOTICE</b>	Indicates information considered important, but not hazard-related (for example, messages relating to property damage).

## General Precautions

 <b>WARNING</b>	To reduce the risk of serious injury or death, read these instructions thoroughly and follow all warnings or cautions included in all manuals that accompanied the product and are attached to the unit. <i>Refer back to these safety instructions as needed.</i>
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- This system should be installed by personnel certified by Johnson Controls-Hitachi Air Conditioning. Personnel must be qualified according to local, state and national building and safety codes and regulations. Incorrect installation could cause leaks, electric shock, fire or explosion. In areas where Seismic Performance requirements are specified, the appropriate measures should be taken during installation to guard against possible damage or injury that might occur in an earthquake if the unit is not installed correctly, injuries may occur due to a falling unit.
- Use appropriate Personal Protective Equipment (PPE), such as gloves and protective goggles and, where appropriate, have a gas mask nearby. Also use electrical protection equipment and tools suited for electrical operation purposes. Keep a quenching cloth and a fire extinguisher nearby during brazing. Use care in handling, rigging, and setting of bulky equipment.
- When transporting, be careful when picking up, moving and mounting these units. Although the unit may be packed using plastic straps, do not use them for transporting the unit from one location to another. Do not stand on or put any material on the unit. Get a partner to help, and bend with your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut fingers, so wear protective gloves.
- Do not touch or adjust any safety devices inside the indoor or outdoor units. All safety features, disengagement, and interlocks must be in place and functioning correctly before the equipment is put into operation. If these devices are improperly adjusted or tampered with in any way, a serious accident can occur. Never bypass or jump-out any safety device or switch.
- Johnson Controls-Hitachi Air Conditioning will not assume any liability for injuries or damage caused by not following steps outlined or described in this manual. Unauthorized modifications to Johnson Controls-Hitachi Air Conditioning products are prohibited as they...
  - May create hazards which could result in death, serious injury or equipment damage;
  - Will void product warranties;
  - May invalidate product regulatory certifications;
  - May violate OSHA standards;

<b>NOTICE</b>	Take the following precautions to reduce the risk of property damage.
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- Be careful that moisture, dust, or variant refrigerant compounds not enter the refrigerant cycle during installation work. Foreign matter could damage internal components or cause blockages.
- If air filters are required on this unit, do not operate the unit without the air filter set in place. If the air filter is not installed, dust may accumulate and breakdown may result.
- Do not install this unit in any place where silicon gases can coalesce. If the silicon gas molecules attach themselves to the surface of the heat exchanger, the finned surfaces will repel water. As a result, any amount of drainage moisture condensate can overflow from the condensate pan and could run inside of the electrical box, possibly causing electrical failures.
- When installing the unit in a hospital or other facility where electromagnetic waves are generated from nearby medical and/or electronic devices, be prepared for noise and electronic interference Electromagnetic Interference (EMI). Do not install where the waves can directly radiate into the electrical box, controller cable, or controller. Inverters, appliances, high-frequency medical equipment, and radio communications equipment may cause the unit to malfunction. The operation of the unit may also adversely affect these same devices. Install the unit at least 10 ft. (approximately 3m) away from such devices.

- When a wireless controller is used, locate at a distance of at least 3.3 ft. (1m) between the indoor unit and electric lighting. If not, the receiver part of the unit may have difficulty receiving operation commands.
- Do not install the unit in any location where animals and plants can come into direct contact with the outlet air stream. Exposure could adversely affect the animals and plants.
- Do not install the unit with any downward slope to the side of the drain adapter. If you do, you may have drain water flowing back which may cause leaks.
- Be sure the condensate hose discharges water properly. If connected incorrectly, it may cause leaks.
- Do not install the unit in any place where oil can seep onto the units, such as table or seating areas in restaurants, and so forth. For these locations or social venues, use specialized units with oil-resistant features built into them. In addition, use a specialized ceiling fan designed for restaurant use. These specialized oil-resistant units can be ordered for such applications. However, in places where large quantities of oil can splash onto the unit, such as a factory, even the specialized units cannot be used. These products should not be installed in such locations.

## Installation Precautions

 <b>WARNING</b>	<p>To reduce the risk of serious injury or death, the following installation precautions must be followed:</p>
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- When installing the unit into...
  - A wall: Make sure the wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.
  - A room: Properly insulate any refrigerant tubing run inside a room to prevent "sweating" that can cause dripping and water damage to wall and floors.
  - Moist or uneven locations: Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the unit to prevent water damage and abnormal vibration.
  - An area with high winds: Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.
  - A snowy area: Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.
- Do not install the unit in the following places. Doing so can result in an explosion, fire, deformation, corrosion, or product failure.
  - Explosive or flammable atmosphere
  - Where a fire, oil, steam or powder can directly enter the unit, such as nearby or above a kitchen stove.
  - Where oil (including machinery oil) may be present.
  - Where corrosive gases such as chlorine, bromine or sulfide can accumulate, such as near a hot tub or hot spring.
  - Where dense, salt-laden airflow is heavy, such as in coastal regions.
  - Where the air quality is of high acidity.
  - Where harmful gases can be generated from decomposition.
- Do not position the condensate pipe for the indoor unit near any sanitary sewers where corrosive gases may be present. If you do, toxic gases can seep into breathable air spaces and can cause respiratory injuries. If the condensate pipe is installed incorrectly, water leakage and damage to the ceiling, floor, furniture, or other possessions may result. If the condensate piping becomes clogged, water may drip from the indoor unit. Do not install the indoor unit where such dripping can cause moisture damage or uneven locations: Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the unit to prevent water damage and abnormal vibration.
- Before performing any brazing work, be sure that there are no flammable materials or open flames nearby.
- Perform a test run to ensure normal operation. Safety guards, shields, barriers, covers, and protective devices must be in place while the compressor/unit is operating. During the test run, keep fingers and clothing away from any moving parts.
- Clean up the site when finished, remembering to check that no metal scraps or bits of wiring have been left inside the unit being installed.

After installation work for the system has been completed, explain the "Safety Precautions," use, and maintenance of the unit to the customer according to the information in all manuals that accompanied the system. All manuals and warranty information must be given to the user or left near the Indoor Unit.

## Refrigerant Precaution

### **WARNING**

To reduce the risk of serious injury or death, the following refrigerant precautions must be followed.

- 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 home 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 Johnson Controls-Hitachi Air Conditioning distributors. Use of any non-approved refrigerant substitutes will void the warranty and will increase the potential risk of injury or death.
- 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. Refrigerant gases can cause asphyxiation (0.026lbs/ft<sup>3</sup> (0.42 kg/m<sup>3</sup>) based on ISO 5149 for R410A). Consult with your distributor for countermeasures (ventilation system and so on). If refrigerant gas has leaked during the installation work, ventilate the room immediately.
- Before installation is complete, make sure that the refrigerant leak test has been performed. If refrigerant gases escape into the air, turn OFF the main switch, extinguish any open flames and contact your service contractor. Refrigerant (Fluorocarbon) for this unit is odorless. If the refrigerant should leak and come into contact with open flames, toxic gas could be generated. Also, because the fluorocarbons are heavier than air, they settle to the floor, which could cause asphyxiation.
- When installing the unit, and connecting refrigerant piping, keep all piping runs as short as possible, and make sure to securely connect the refrigerant piping before the compressor starts operating. If the refrigerant piping is not connected and the compressor activates with the stop valve opened, the refrigerant cycle will become subjected to extremely high pressure, which can cause an explosion or fire.
- 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.
- A compressor/unit comprises a pressurized system. Never loosen threaded joints while the system is under pressure and never open pressurized system parts.
- When maintaining, relocating, and disposing of the unit, dismantle the refrigerant piping after the compressor stops.

## Electrical Precautions

### **WARNING**

Take the following precautions to reduce the risk of electric shock, fire or explosion resulting in serious injury or death.

- 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.
- Before servicing, open and tag all disconnect switches. Never assume electrical power is disconnected. Check with meter and equipment.
- Only use electrical protection equipment and tools suited for this installation.
- Use specified cables between units.
- Communication cabling shall be a minimum of AWG18 (0.82mm<sup>2</sup>), 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.
- Use an exclusive power supply for the air conditioner at the unit's rated voltage.
- 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.
- Clamp electrical wires securely with a cord clamp after all wiring is connected to the terminal block. In addition, run wires securely through the wiring access channel.

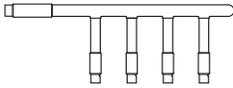
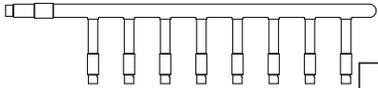
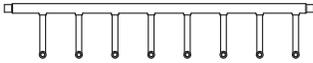
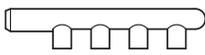
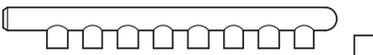
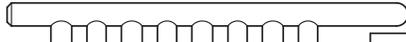
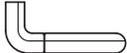
- When installing the power lines, do not apply tension to the cables. Secure the suspended cables at regular intervals, but not too tightly.
- Make sure that the terminals do not come into contact with the surface of the electrical box. If the terminals are too close to the surface, it may lead to failures at the terminal connection.
- Turn OFF and disconnect the unit from the power supply when handling the service connector. Do not open the service cover or access panel to the indoor or outdoor units without turning OFF the main power supply.
- 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 to ensure that no residual voltage is present after disconnecting the power supply.
- Do not clean with, or pour water into, the controller as it could cause electric shock and/or damage the unit. Do not use strong detergent such as a solvent. Clean with a soft cloth.
- Check that the ground wire is securely connected. Do not connect ground wiring to gas piping, water piping, lighting conductor, or telephone ground wiring.
- If a circuit breaker or fuse is frequently activated, shut down the system and contact your service contractor.

# ⚠ CAUTION

Do not lay any material on this product.

### 3. Before Installation

IMPORTANT! Confirm the number of the following parts kit by referencing the model number printed on the package before opening. Do NOT intermix any foreign objects within this kit. Verify that no foreign objects are present inside any kit components prior to installation.

Name of Parts		MH-NP224A			MH-NP288A														
				Qty.			Qty.												
Branch Pipe for Gas Line					1			1											
Branch Pipe for Liquid Line					1			1											
Insulation for Gas Line					1			1											
Insulation for Liquid Line					1			1											
Accessories	Closing Pipe	For Gas Line $\phi 1/2$		2	For Liquid Line $\phi 1/4$		2	For Liquid Header $\phi 3/8$		1	For Gas Line $\phi 1/2$		6	For Liquid Line $\phi 1/4$		6	For Liquid Header $\phi 3/8$		1
		Expander for Gas Line		—			None			2									
		Expander for Liquid Line					4			8									
	Insulation for Closing Pipe					2 sets			6 sets										
	Insulation for Liquid Line					4 sets			8 sets										
	Tape					24			48										

Unit: inch

**NOTE** : If any of these parts are missing, please contact your distributor. Do not discard any foam packaging as it is used as insulation for the joint kits after pressure testing is complete.

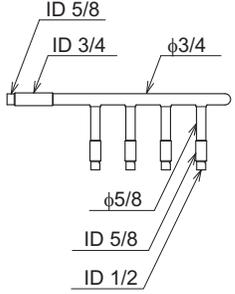
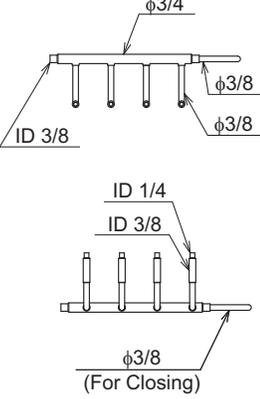
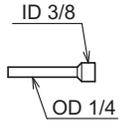
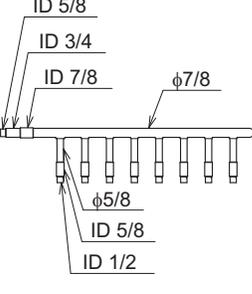
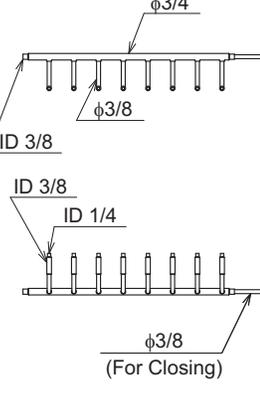
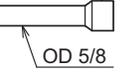
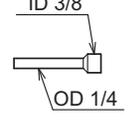
## 4. Installation Work

### 4.1 Piping Connection Size

The ends of the multi-kits are finished as shown in the following figures. Cut the end of the pipe to correspond with the pipe size.

# ⚠ CAUTION

**Allow adequate room for elbow, angled, and irregular piping arrangements to compensate for expansion and contraction brought on by temperature change.**

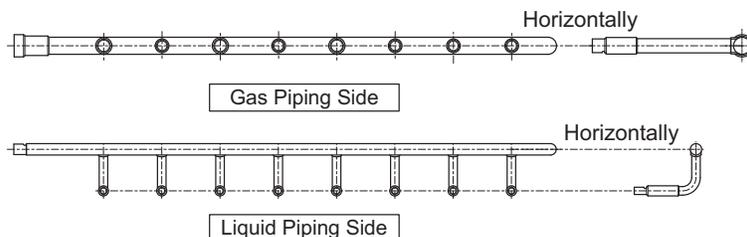
Models	Gas Line	Liquid Line	Expander	Closing Pipe		
MH-NP224A			(For Gas Line)	 Qty.: 2		
			(For Liquid Line)	 Qty.: 4	(For Liquid Line)	 Qty.: 2
MH-NP288A			(For Gas Line)	 Qty.: 2	(For Gas Line)	 Qty.: 6
			(For Liquid Line)	 Qty.: 8	(For Liquid Line)	 Qty.: 6

Unit: inch, ID: Inner Diameter, OD: Outer Diameter

### 4.2 Installation Position

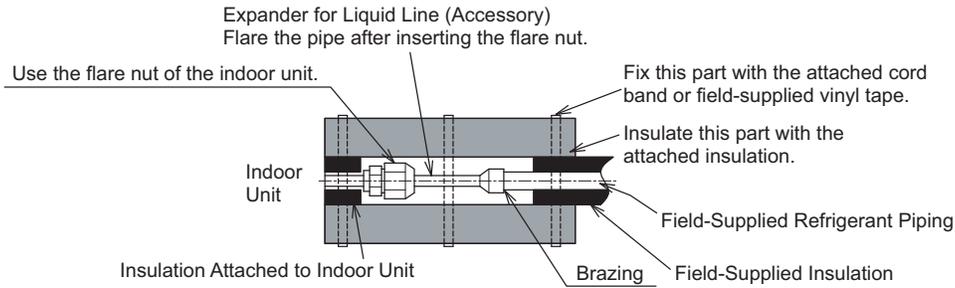
Perform to install horizontally always.

(Example: Model MH-NP288A)



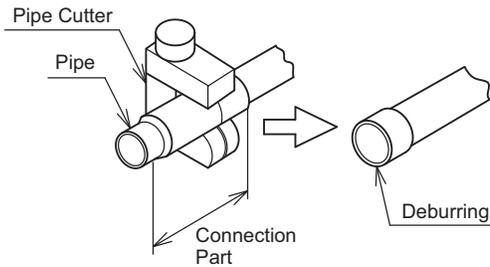
### 4.3 Connection Procedure for Piping Joint

When connecting liquid piping for a unit with a capacity of 15 MBH or smaller, and with a length of piping 49.2ft (15m) or longer, apply a piping size of 3/8 inch (9.52mm). Secure the connecting pipe as shown in the figure below. Use the insulation attached to the indoor unit.



### 4.4 Piping Work

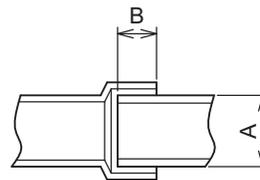
- Use clean copper pipes without any moisture or foreign materials on inner surface of pipes. When connecting refrigerant pipe, cut the copper pipes with a pipe cutter as shown below. Also blow-out the pipes with nitrogen or compressed air to ensure that no dust remains inside the pipe. Do NOT use a saw, a grindstone or others which causes a large amount of cutting powder.



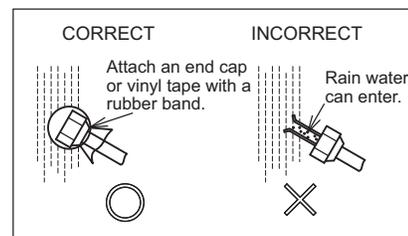
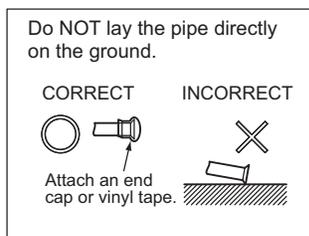
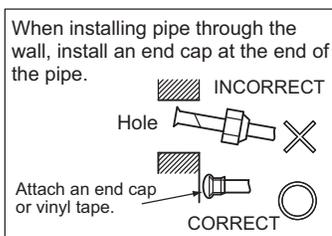
- When cutting piping, secure the adequate depth for brazing as shown in the following table.

inch (mm)

Diameter (A)	Min. Insertion Depth (B)
$3/16 \leq A < 5/16$ ( $5 \leq A < 8$ )	1/4 (6)
$5/16 \leq A < 15/32$ ( $8 \leq A < 12$ )	9/32 (7)
$15/32 \leq A < 5/8$ ( $12 \leq A < 16$ )	5/16 (8)
$5/8 \leq A < 31/32$ ( $16 \leq A < 25$ )	13/32 (10)
$31/32 \leq A < 1-3/8$ ( $25 \leq A < 35$ )	15/32 (12)
$1-3/8 \leq A < 1-25/32$ ( $35 \leq A < 45$ )	9/16 (14)



### • Caution for Refrigerant Piping



- (3) Make sure that all stop valves for the outdoor unit are closed completely.
- (4) Bleed nitrogen gas through refrigerant lines when brazing. Pressure should not exceed 2.9psi (0.02MPa).

## ⚠ DANGER

**Make sure that a test for leakage of refrigerant gases has been performed. The refrigerant used for this unit (HFC R410A), is a non-flammable, non-toxic, and odorless gas. However if refrigerant should leak and make contact with sparks, fire; toxic gas will be generated. Also, because the fluorocarbon is heavier than air, the floor surface will be filled with it, which could cause suffocation.**

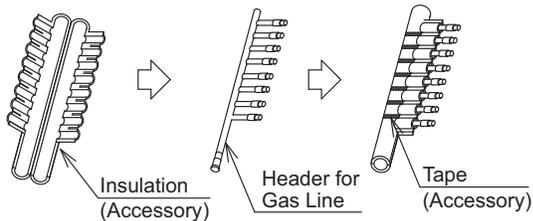
- (5) The air-tight test pressure of this product is 601psi (4.15MPa).
- (6) Install the field-supplied insulation with these multi-kits to each branch (liquid side and gaseous side), with tape. Also, apply the field-supplied insulation for these units.

### NOTE

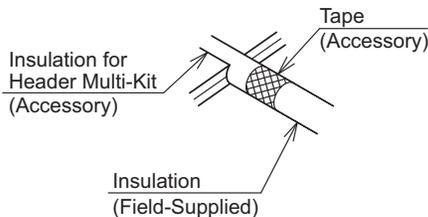
When polyethylene foam is applied, a thickness of 13/32 inch (10mm) for liquid piping and 19/32 to 25/32 inch (15 to 20mm) for gas piping is recommended. (Use a grade of insulation with a heat resistance value of 212°F (100°C) for gas piping.)

#### For Gas Side

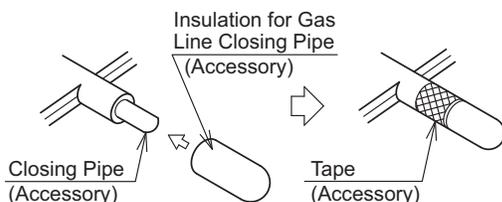
- a) Cover the gas header with the insulation as shown below.



- b) Seal the joint portion of insulation with tape (accessory).

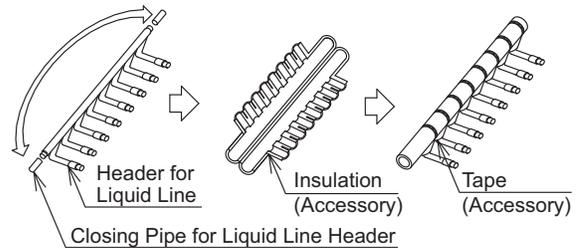


- c) Attach the insulation (accessory) to the closed-off end of pipe. Then seal the joint portion with tape (accessory).

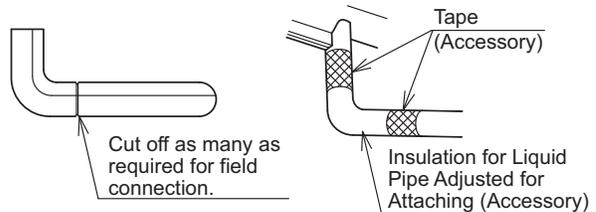


#### For Liquid Side

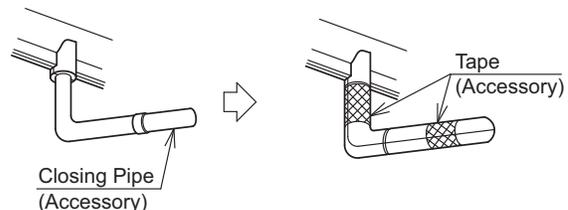
- a) Braze the pipe cap to the open end of the liquid header, opposite the liquid line connection. Cover the liquid line header with the insulation after pipe temperature decreases to room temperature.



- b) Cut the sections of insulation for liquid piping as often as required.



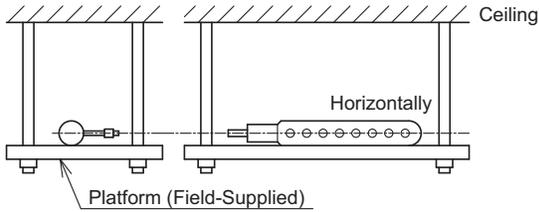
- c) Seal the joint for the closed-off end of pipe with tape (accessory) after attaching the liquid pipe insulation.



- **Caution for Installation**

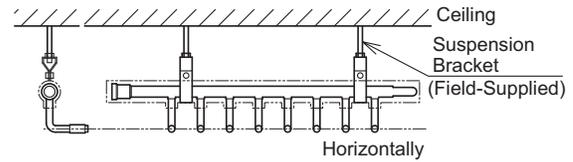
### Branch Pipe for Gas Line

Install the branch pipe horizontally by placing it on the platform.



### Branch Pipe for Liquid Line

Suspend the branch pipe from the ceiling so that the branch pipe port openings are horizontal.



## **CAUTION**

- **Perform insulation work only when the surface temperature of the pipe material has cooled to room temperature. Anything done immediately after brazing can cause insulation to melt.**
- **During piping work, always cover over or plug the open end to keep the inside free of dust and moisture.**

After installation, it is recommended that the customer retain this manual for future reference.



