



Operation Installation & Maintenance Manual

INVERTER-DRIVEN
MULTI-SPLIT AIR-
CONDITIONER
(HEAT PUMP)

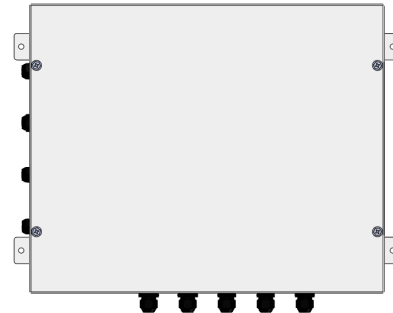
- AHU CONNECTION KIT -

Type	Power Source	Model
AHU CONNECTION KIT	208/230V ~ 60Hz	SPAK-02, SPAK-04, SPAK-06, SPAK-10, SPAK-20, SPAK-30

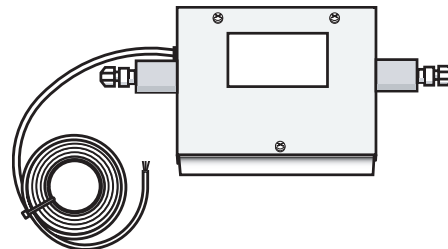
IMPORTANT:

READ AND UNDERSTAND
THIS MANUAL BEFORE
USING THIS HEAT-PUMP
AIR CONDITIONERS.
KEEP THIS MANUAL FOR
FUTURE REFERENCE.

CONTROL BOX



EXPANSION VALVE BOX



ORIGINAL INSTRUCTIONS

Preface

- Do not use this product for specific purposes, such as restoring foods, animals, plants, confidential devices and work of art.
- Do not install the unit in the following places. Oil adhesion may cause a fire and also deformation, breakage or corrosion of plastic parts.
 - * Places where oil (including machinery oil) mist and steam drift.
 - * Places where a lot of sulfide gas drifts such as in hot spring.
 - * Places where a periodical check is difficult to perform such as inside the wall.
- Do not install the unit in the following places. It may cause corrosion.
 - * Places where air contains high salt contents in coast regions.
 - * Places with atmosphere of acidity or alkalinity.
- In case of using a medical equipment or radio generating electromagnetic wave, pay particular attention to unit malfunction. Do not install the unit where electromagnetic wave is directly radiated to the electrical box in the indoor unit, remote control wiring and remote control switch. The unit should be placed at least 9.8ft.(approximately 3m) away from these equipment to avoid any radiation transmitting in the air.
- Do not install the unit where the breeze directly catches the animals and plants. It could adversely affect the animals and plants.

IMPORTANT NOTICE

- Read and understand the safety summary before installing the unit.
- Our company pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- Our company cannot anticipate every possible circumstance that might involve a potential hazard.
- This heat pump air conditioner is designed for standard air conditioning 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.
- The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available. International Organization for Standardization, ISO5149 or Japan Standard, KHK0010.
- No part of this manual may be reproduced without written permission.
- Signal words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.



: Immediate hazards which WILL result in severe personal injury or death.



: Hazards or unsafe practices which COULD result in severe personal injury or death.



: Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.



CAUTION

NOTE

: Useful information for operation and/or maintenance.

It is assumed that this heat pump air conditioner will be operated and serviced by English speaking people. If this is not the case, the customer should add safety, caution and operating signs in the native language.

- If you have any questions, contact your distributor or dealer of our company.
- This manual gives a common description and information for this heat pump air conditioner which you operate as well as for other models.
- Our company's heat pump air conditioner has been designed for the following temperatures. Operate the heat pump air conditioner within this range.

Temperature

		Maximum	Minimum
Cooling Operation	Indoor	90°F DB/74°F WB (32°C DB/23°C WB)	70°F DB/59°F WB (21°C DB/15°C WB)
	Outdoor	110°F DB (43°C DB) *	23°F DB (-5°C DB) *
Heating Operation	Indoor	80°F DB (27°C DB)	59°F DB (15°C DB)
	Outdoor	59°F WB (15°C WB) *	-4°F WB (-20°C WB) *

DB: Dry Bulb, WB: Wet Bulb

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

IMPORTANT NOTICE



Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage.
Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.

The standard utilization of the unit shall be explained in these instructions.

Therefore, the utilization of the unit other than those indicated in these instructions is not recommended.

Please contact your local agent, as the occasion arises.

Our company's liability shall not cover defects arising from the alteration performed by a customer without our company's consent in a written form.

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1 Safety Summary

DANGER

- This product is for specified use with incombustible refrigerant R410A. Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.
- Do not pour water into the indoor or outdoor unit. These products are equipped with electrical parts. If poured, it will cause a serious electrical shock.
- Do not touch or adjust safety devices inside the indoor or outdoor units. If these devices are touched or readjusted, it may cause a serious accident.
- Do not open the service cover or access panel for the indoor or outdoor units without turning OFF the main power supply.
- Refrigerant leakage can cause difficulty with breathing due to insufficient air. Turn OFF the main switch, extinguish any naked flames and contact your service contractor, if refrigerant leakage occurs.
- The installer and system specialist shall secure safety against refrigerant leakage according to local regulations or standards.
- Use an ELB (Electric Leakage Breaker). In the event of a fault, there is danger of an electric shock or a fire if it is not used.
- Do not install the outdoor unit where there is a high level of oil mist, flammable gases, salty air or harmful gases such as sulphur.
- This product is designed for indoor or outdoor installation. All wires should be protected from outdoor environment.
- Do not perform installation work without referring to this Installation Manual. If the instructions are not followed, it may result in a water leakage, electric shock or fire.
- Secure the sufficiently strong foundation when installing. If not, it may lead to falling of the unit and injury.
- Do not install where generation or flowing of flammable gas may be detected. It may cause a fire.
- Do not step or put any material on the product.
- When using refrigerant, wear leather gloves to prevent cold injuries.
- Check the refrigerant leakage. The refrigerant R410A is incombustible, non-toxic and odorless of HFC gas. However, if leakage occurs and gas fills a room, it may cause difficulty with breathing due to insufficient air.
- Ask the electrical shop where the qualified electrical engineer is provided for electrical work to avoid an electrical shock and fire disaster.
- Perform electrical work according to Installation Manual and use all relevant regulations and standards. If not, it may cause an electrical shock or fire.
- Fix the cables securely with the cord clamp. External forces on the connectors may lead to a fire.
- Power supply is turned OFF before electrical wiring work or a periodical check is performed.
- Protect the wires and electrical parts from rats or other small animals. If not, rats may gnaw at the unprotected parts and at the worst, a fire may occur.
- Place the expansion valve box cable away from the power source cable to avoid malfunction.

WARNING

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within 3.3ft. (approximately 1 meter) from the system.
- If circuit breaker or fuse is often activated, stop the system and contact your service contractor.
- Do not perform installation work, refrigerant piping work, drain piping and electrical wiring connection without referring to our installation manual. If the instructions are not followed, it may result in a water leakage, electric shock or a fire.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it lead electric shock. Do not connect the ground wiring to gas piping, water piping, lightning conductor or ground wiring for telephone.
- Connect a fuse of specified capacity.
- Do not put any foreign material on the unit or inside the unit.
- Make sure that the outdoor unit is not covered with snow or ice, before operation.
- Before performing any brazing work, check to ensure that there is no flammable material around. When using refrigerant be sure to wear leather gloves to prevent cold injuries.
- Protect the wires, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and which may lead to a fire.
- Fix the cables securely. External forces on the terminals could lead to a fire.

CAUTION

- Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 9.8ft. (approximately 3 meters) from strong electromagnetic wave radiators such as medical equipment.
 - Supply electrical power to the system to energize the oil heater for 12 hours before start-up after a long shutdown.
 - Do not step or put any material on the product.
 - Provide a strong and correct foundation so that;
 - a. The outdoor unit is not on an incline.
 - b. Abnormal sound does not occur.
 - c. The outdoor unit will not fall down due to a strong wind or earthquake.
 - Do not fasten flare nut hard. It may cause breakage with aged deterioration and refrigerant leakage. Use a specified flare nut.
-
- The appliance is not to be used by children or person with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by person responsible for their safe.
 - Children should be supervised they do not play with the appliance.
 - The appliance should not be installed in the laundry.

NOTE

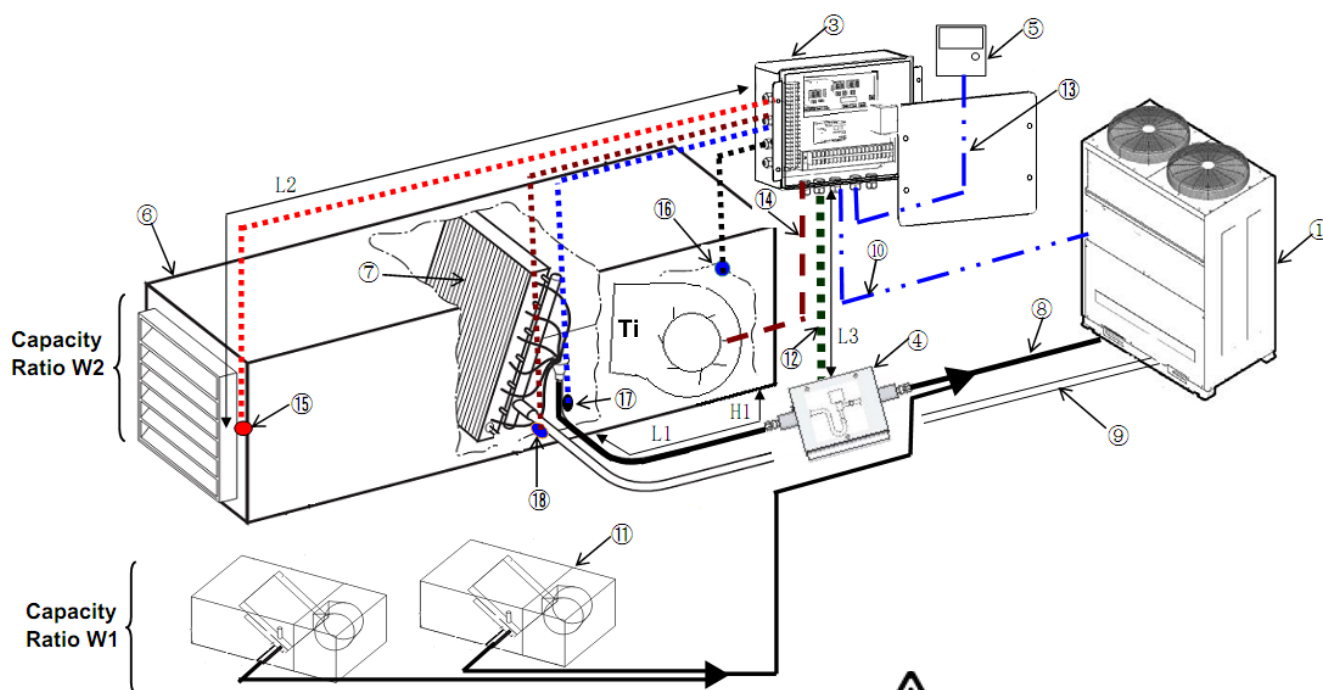
- It is recommended that the room be ventilated every 3 to 4 hours.
- Operate the heat pump air conditioner within this range.
 - Regarding installation altitude below 3300ft.(aproximately 1000m);
 - Regarding frequency of supply power within $\pm 1\%$ Hz of rated frequency.
 - Regarding transport storage temperature within -13~131°F.
- The A-weighted emission sound pressure level at workstations, all this level does not exceed 70dB(A).

2 System Description

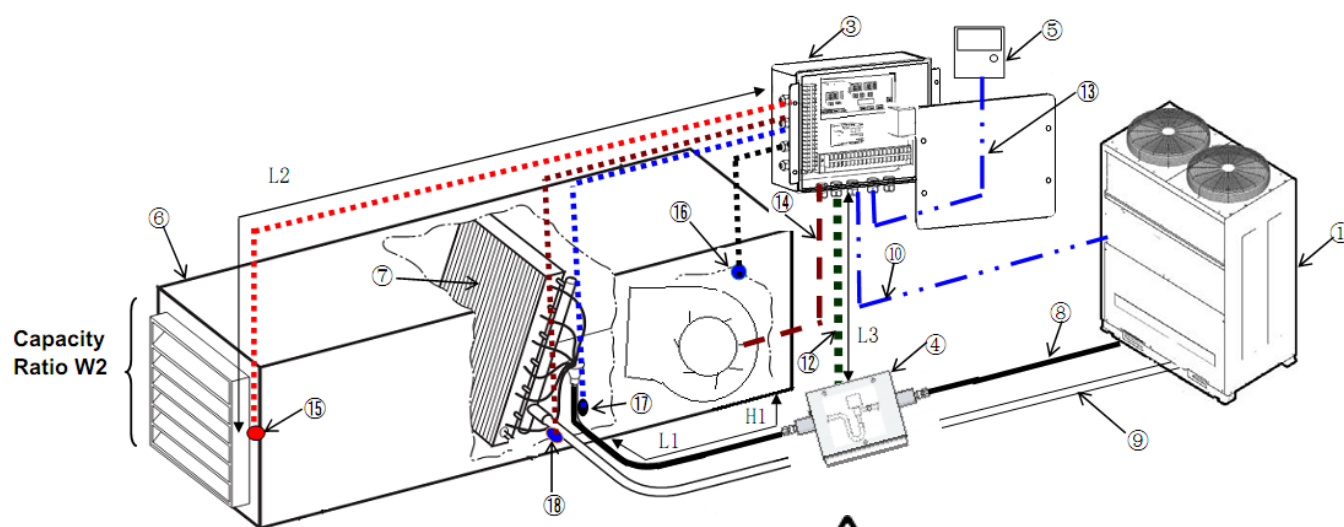
AHU CONNECTION KIT is specially designed to allow connection of direct expansion coils, included a field-supplied Air Handling Unit (AHU) to INVERTER-DRIVEN MULTI-SPLIT AIR CONDITIONER (HEAT PUMP) outdoor units for cooling and heating applications.

2.1 System Overview

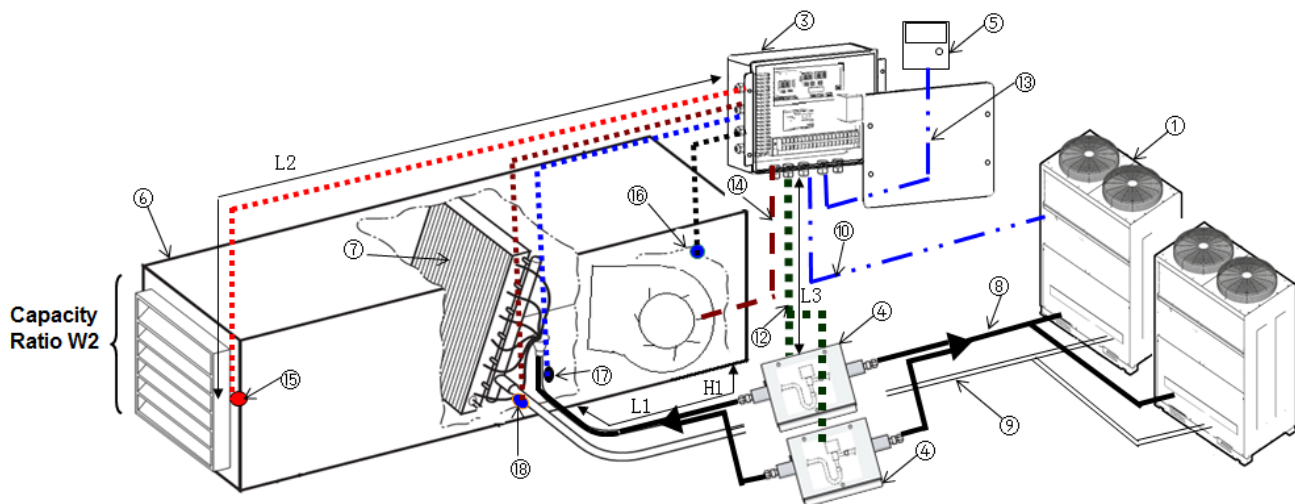
AHU CONNECTION KIT is composed of Control Box for system control, where it is included the PCB and all the electronic stuff, and Expansion Valve Box for refrigerant cycle control, where the electrical expansion valve is located. The following figure shows an installation example for the system.



Multi combination with AHU and standard indoor unit, only for SPAK-02~06(2-6HP, 19-54kBtu/h)



Single combination with only AHU, for SPAK-10 (8-10HP, 76-96kBtu/h)
SPAK-20 (12-20HP, 114-190kBtu/h)



Single combination with only AHU, for SPAK-30 (22-30HP, 212-287kBtu/h)

NOTE

The two Expansion Valve Boxes wire to the same terminal of Control Box referring to chapter 5.5

Fig.2.1 System Overview

Item	Description
1	Outdoor unit
2	AHU CONNECTION KIT
3	Control box
4	Expansion valve box
5	Remote controller
6	AHU
7	Heat exchanger
8	Liquid line
9	Gas line
10	Outdoor-Indoor communication
11	Standard indoor unit
12	Control wires for electrical expansion valve

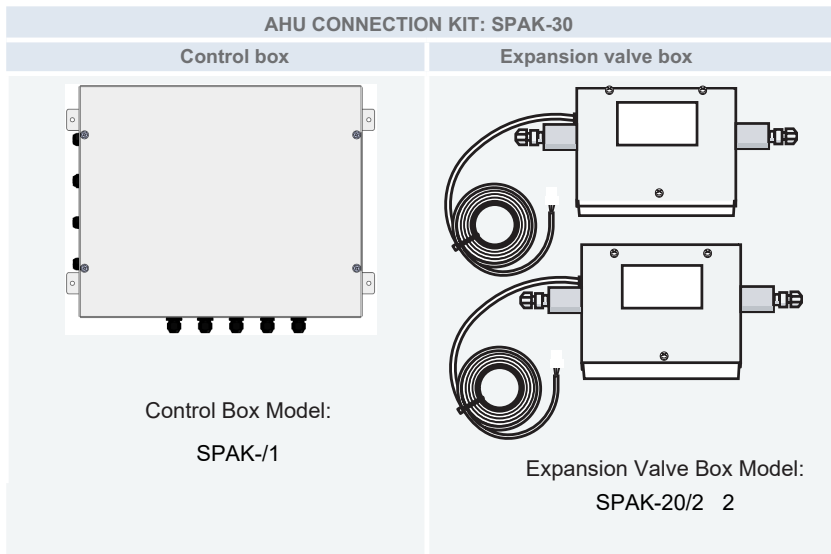
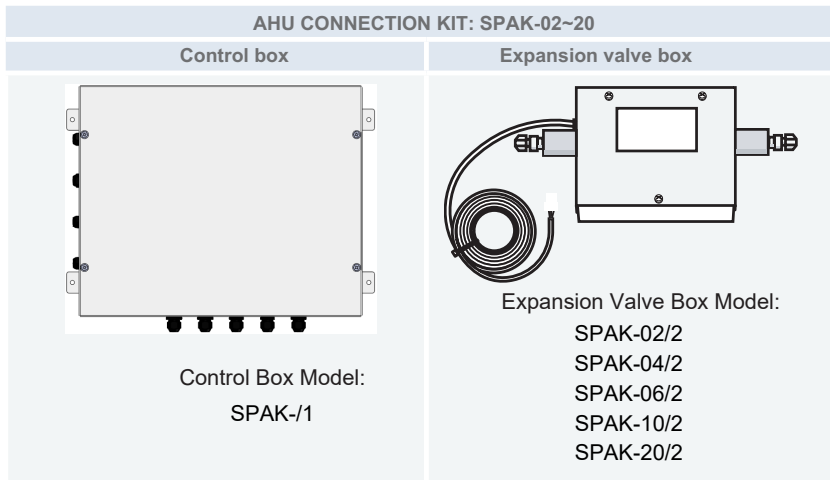
Item	Description
13	Remote controller communication
14	Control wires for AHU
15	Outlet air thermistor
16	Inlet air thermistor
17	Liquid Pipe thermistor
18	Gas Pipe thermistor








- The installation distance between the AHU CONNECTION KIT and the AHU must be shortest possible.
- Keep the distance between the unit or device with heat exchanger and the expansion valve box for the piping length up to 16.4ft. (approximately 5m). Also the elevation difference between the unit or device with heat exchanger and the expansion valve box must be no more than 6.6ft. (approximately 2m).
- Make sure that the installation distance between the control box and the unit or device with heat exchanger is short enough that the thermistors sensing are not distorted.
- The thermistor cable should never be installed in the same ducting as power or control cables.

2.2 Production Lineup











AHU CONNECTION KIT is composed of Control Box and Expansion Valve Box.



Production Lineup and Capacity

AHU CONNECTION KIT Model	Nom Heat Exchanger Capacity of AHU	Capacity Code Setting (DSW3)	Expansion Valve Box Model:	Control Box Model:
SPAK-02	19kBtu/h(2HP)		SPAK-02/2	SPAK-/1
SPAK-04	36kBtu/h(4HP)		SPAK-04/2	
SPAK-06	54kBtu/h(6HP)		SPAK-06/2	
SPAK-10	76kBtu/h(8HP)		SPAK-10/2	
	96kBtu/h(10HP)			

Production Lineup and Capacity






AHU CONNECTION KIT Model	Nom Heat Exchanger Capacity of AHU	Capacity Code Setting (DSW3)	Expansion Valve Box Model:	Control Box Model:
SPAK-20	114kBtu/h(12HP)	 ON OFF	SPAK-20/2	SPAK-/1
	132kBtu/h(14HP)	 ON OFF		
	154kBtu/h(16HP)	 ON OFF		
	170kBtu/h(18HP)	 ON OFF		
	190kBtu/h(20HP)	 ON OFF		
SPAK-30	212kBtu/h(22HP)	 ON OFF	SPAK-20/2 SPAK-20/2	
	232kBtu/h(24HP)	 ON OFF		
	250kBtu/h(26HP)	 ON OFF		
	272kBtu/h(28HP)	 ON OFF		
	287kBtu/h(30HP)	 ON OFF		

NOTE

- Capacity Code (DSW3) must be set corresponding to the nom heat exchanger Capacity of the AHU. DSW3 is located in the main printed circuit board in control box.

2.3 Accessories

Check the following content and number of accessories in the package before installation.

Name Description	Q'ty	Purpose
Control Box 	1	System control box
Expansion Valve Box 	02~20: 1 22~30: 2	Expansion valve for refrigerant cycle control [19.7ft.(6m) wire]
Wired Remote Controller 	1	System setting and control
Thermistor 	4	Temperature sensing: Outlet air [red, 32.8ft.(10m)] Inlet air [blue, 32.8ft.(10m)] Liquid Pipe [black, 32.8ft.(10m)] Gas Pipe [yellow, 32.8ft.(10m)]
Operation and Installation manual 	1	Instructions and important notice

2.4 Limitation of Installation and AHU

CAUTION

Limitation of Installation and Application

The following symbols refer to Fig.2.1 System Overview.

L1: the distance between the heat exchanger of AHU and the Expansion Valve for the piping length.
Keep the distance no more than 16.4ft.(5m).

H1: the height difference between the heat exchanger of AHU and the Expansion Valve . Keep the difference no more than 6.6ft.(2m).

L2 The Length of thermistor for Outlet air/Inlet air/Liquid Pipe/Gas Pipe.The length is no more than 32.8ft.(10m).

L3: The Length of control wires for electrical expansion valve.The length is no more than 32.8ft.(10m). Ti: the suction air temperature just before the dx-coil. The temperature range:

Cooling:62°F(17°C DB) to 95°F(35°C DB)/74°F(23°C WB)

Heating:50°F(10°C DB) to 80°F(27°C DB)

W2: The total AHU capacity with AHU KIT to outdoor unit capacity.

W1: The total standard indoor unit capacity to outdoor unit capacity.

For Multi combination with AHU and standard indoor unit

W2: No more than 30%, W1+W2:no more than 110%
















For Single combination with only AHU:

W2: No more than 100%

Selection and Limitation of Heat Exchanger of AHU

Select the Heat Exchanger of AHU (field-supplied) according to the technical data and limitations mentioned below.

Lifetime of the outdoor unit, operation range or operation reliability may be influenced if you neglect these limitations.

AHU CONNECTION KIT Model	Nom Heat Exchanger Capacity of AHU	Capacity Code Setting (DSW3)	Allowed heat exchanger capacity (kBtu/h) *				Heat exchanger volume (in. ³)		Equivalent indoor unit capacity
			Mode	Min	Nom	Max	Min	Max	
SPAK-02	19kBtu/h(2HP)	 ON OFF	Cooling	13.6	17.1	19.1	34.8	70.8	19kBtu/h(2HP)
			Heating	15.7	19.1	24.2			
SPAK-04	36kBtu/h(4HP)	 ON OFF	Cooling	24.2	30.7	38.2	62.9	144.6	36kBtu/h(4HP)
			Heating	27.3	34.1	42.7			
SPAK-06	54kBtu/h(6HP)	 ON OFF	Cooling	38.2	47.8	54.6	117.2	178.2	54kBtu/h(6HP)
			Heating	42.7	54.6	61.4			
SPAK-10	76kBtu/h(8HP)	 ON OFF	Cooling	54.6	68.2	76.4	178.2	237.4	76kBtu/h(8HP)
			Heating	61.1	76.4	85.3			
	96kBtu/h(10HP)	 ON OFF	Cooling	68.2	85.3	95.5	237.4	290.5	96kBtu/h(10HP)
			Heating	76.4	95.5	107.5			
SPAK-20	114kBtu/h(12HP)	 ON OFF	Cooling	95.5	102.4	114.3	290.5	360.6	114kBtu/h(12HP)
			Heating	107.5	114.3	128.0			
	132kBtu/h(14HP)	 ON OFF	Cooling	114.3	119.4	136.5	357.0	420.5	132kBtu/h(14HP)
			Heating	128.0	136.5	153.5			
	154kBtu/h(16HP)	 ON OFF	Cooling	136.5	146.7	153.5	414.4	488.2	154kBtu/h(16HP)
			Heating	153.5	162.1	170.6			
	170kBtu/h(18HP)	 ON OFF	Cooling	153.5	163.8	170.6	461.9	544.3	170kBtu/h(18HP)
			Heating	170.6	180.8	191.1			
SPAK-30	190kBtu/h(20HP)	 ON OFF	Cooling	170.6	177.4	191.1	516.9	608.4	190kBtu/h(20HP)
			Heating	191.1	204.7	215.0			
	212kBtu/h(22HP)	 ON OFF	Cooling	191.1	197.9	209.8	551.7	679.2	212kBtu/h(22HP)
			Heating	215.0	225.2	235.4			
	232kBtu/h(24HP)	 ON OFF	Cooling	209.8	221.8	235.4	579.7	753.0	232kBtu/h(24HP)
			Heating	235.4	255.9	264.4			
	250kBtu/h(26HP)	 ON OFF	Cooling	235.4	242.3	249.1	634.0	786.6	250kBtu/h(26HP)
			Heating	264.4	269.6	281.5			
	272kBtu/h(28HP)	 ON OFF	Cooling	249.1	259.3	273.0	695.1	845.8	272kBtu/h(28HP)
			Heating	281.5	293.4	307.1			
	287kBtu/h(30HP)	 ON OFF	Cooling	273.0	279.8	290.0	754.3	898.9	287kBtu/h(30HP)
			Heating	307.1	313.9	324.2			

* Cooling and heating capacity data based on the following indoor and outdoor temperature conditions:

Operation conditions		Cooling*	Heating*
Indoor air inlet temperature	DB	80°F DB (27°C)	68°F DB (20°C)
	WB	66°F DB (19°C)	—
Outdoor air inlet temperature	DB	95°F DB (35°C)	44°F DB (7°C)
	WB	—	42°F DB (6°C)

DB: dry bulb. WB: wet bulb. Pipe length: 24.6ft.(7.5m). Pipe height: 0ft.

*Cooling:

1.Evaporation temperature: 44°F(7°C)

2.Superheat (SH) : 5 K

3.Pressure drop of the refrigerant flow in heat exchanger :
Max. 22psi.(0.15MPa)

*Heating:

1. Condensation temperature:116°F(47°C)

2. Subcool (SC) = 15 K

3. Pressure drop of the refrigerant flow in heat exchanger :
Max. 9psi. (0.06MPa)

⚠ CAUTION

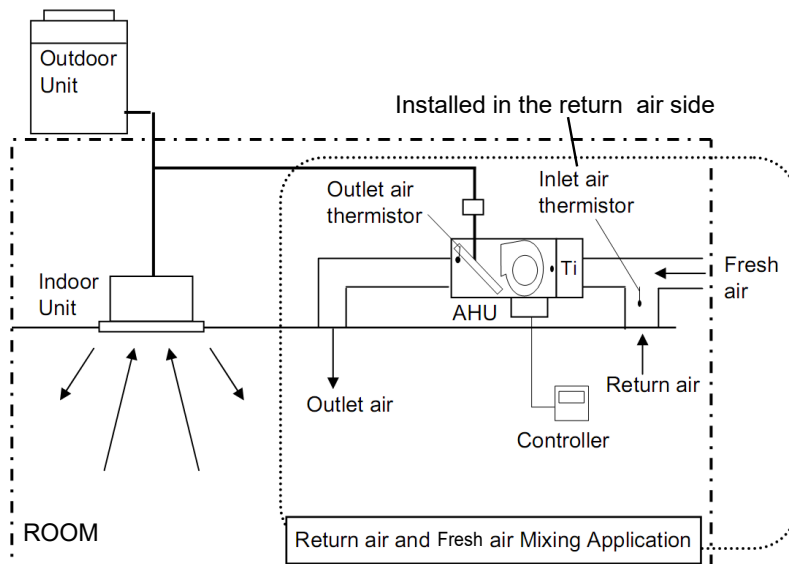
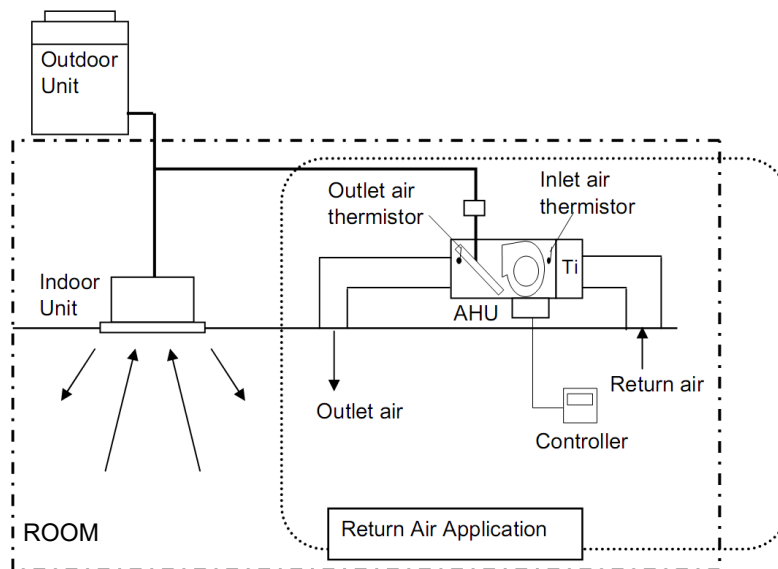
- The selected heat exchanger of AHU must be designed for R410A. The design pressure of the heat exchanger is 602 psi.(4.15MPa) The burst pressure of heat exchanger and other pipes must exceed 1806 psi.(12.45MPa). Insufficient strength may cause the pipes to crack and result in gas leakage.
- Refrigerant leakage rate of the heat exchanger is no more than 0.18oz(5g) per year.
- Water content and impurity content in the heat exchanger will cause blocking of refrigerant cycle and failure of compressor and valve. Water content in the heat exchanger is no more than 60PPM. Impurity content in the heat exchanger is no more than 0.0035oz(100mg).

2.5 Capacity Control Mode

Capacity control mode means the kind of capacity control by AHU CONNECTION KIT to adapt the system performance according to the the cooling and heating load required by the user.

(1) Inlet air (room air) temperature control

- Capacity control: For controlling the inlet air (room air) temperature, the capacity is adapted so that detection temperature of inlet air (room air) reaches the set temperature by remote controller.
- Thermostat control: The thermostat becomes OFF if detection temperature of inlet air (room air) has reached the set temperature by remote controller.



⚠ CAUTION

- For controlling the Inlet air (room air) temperature, the optional setting item E1 must be set as 00 (factory setting) in optional setting of the unit by remote controller. Referring to Optional Setting and Input/Output Setting (chapter 6.2) .
- The set temperature by remote controller*
Cooling: 60--90 °F (16--32 °C)
Heating: 60--90 °F (16--32 °C)

(2) Outlet air temperature control

- Capacity control: For controlling the outlet air temperature, the capacity is adapted so that detection temperature of outlet air of AHU reaches the correction temperature of the set temperature for outlet air by remote controller.

The correction temperature of the set temperature for outlet air by remote controller is :

Cooling: the set temperature by remote controller + bb

Heating: the set temperature by remote controller + b1

bb, b1: Compensation of outlet air temperature setting, set by remote controller in optional setting of the unit. Referring to Optional Setting and Input/Output Setting (chapter 6.2).

bb: 22 °F (-6 °C, factory setting: 00)

b1: 40 °F (+4 °C, factory setting: 00)

bb: 24 °F (-4 °C, set by remote controller: 01)

b1: 32 °F (0 °C, set by remote controller: 01)

bb: 28 °F (-2 °C, set by remote controller: 02)

b1: 36 °F (+2 °C, set by remote controller: 02)

- Thermostat control: the thermostat becomes OFF if detection temperature of inlet air and the correction temperature of the set temperature for thermostat by remote controller has no difference.

The correction temperature of the set temperature for thermostat by remote controller is :

Cooling: the set temperature by remote controller + bb + CF

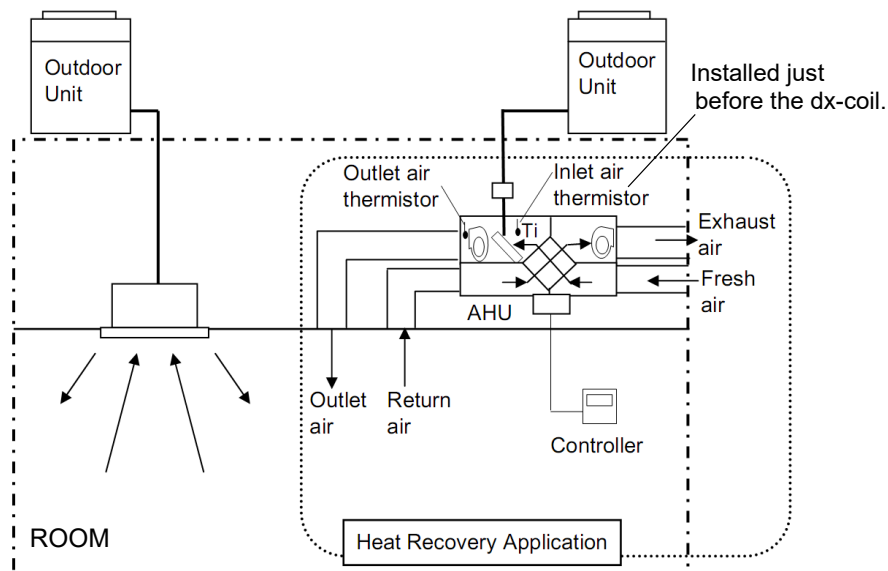
Heating: the set temperature by remote controller + b1 - CF

CF: Compensation of thermostat temperature setting, Set by remote controller in optional setting of the unit. Referring to Optional Setting and Input/Output Setting (chapter 6.2).

CF: 32 °F (0 °C, factory setting: 00)

CF: 36 °F (2 °C, set by remote controller: 01)

CF: 41 °F (5 °C, set by remote controller: 02)



⚠ CAUTION

- For controlling the outlet air temperature, the compatible outdoor units, including Urban VRF units (top-flow modular outdoor units) and Urban mini VRF units (front-flow outdoor units), must have the outlet air temperature control function. Indoor units cannot be connected to the outdoor units which have been connected to AHU.
- The optional setting item E1 must be set as 01 in optional setting of the unit by remote controller. Referring to Optional Setting and Input/Output Setting (chapter 6.2) .

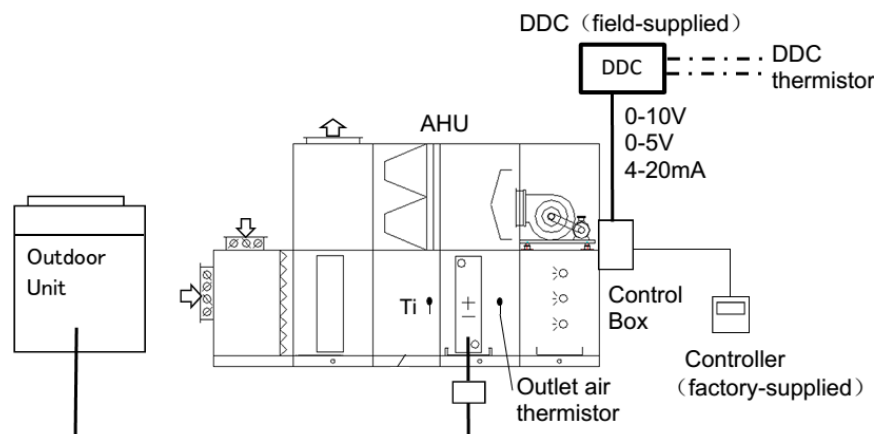
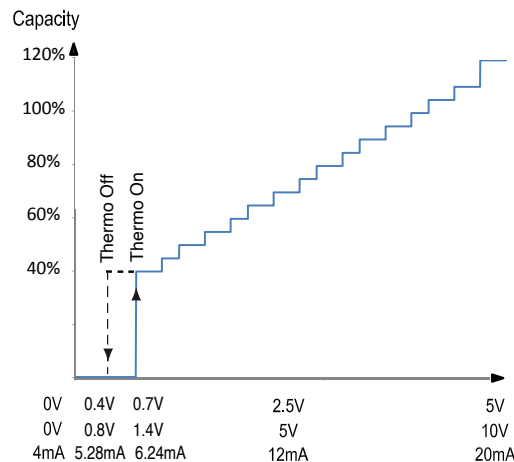
The optional setting item of outdoor unit $F1$ must be set as 2 for Urban VRF units (top-discharge modular outdoor units) in optional function setting of outdoor unit from outdoor unit PCB. Referring to OPTIONAL FUNCTION of outdoor unit service manual.

- The optional setting item of outdoor unit $F2$ must be set as 1 for Urban mini VRF units (front-discharge outdoor units) in optional function setting of outdoor unit from outdoor unit PCB. Referring to OPTIONAL FUNCTION of outdoor unit service manual.
- The set temperature by remote controller.*
Cooling: 60--90°F (16--32°C)
Heating: 60--90°F (16--32°C)
- The outlet air temperature may not reach due to outside temperature limitation and protection for outdoor units.

(3) Duty signal control

- Capacity control: The capacity of outdoor unit is fixed by an external duty signal, which can be a free-voltage signal (0~10V or 0~5V) or a current signal (4~20mA). The duty signal is generated by a field-supplied DDC and supplied to the AHU Connection Kit. The capacity of outdoor unit depends on the signal strength.
- Thermostat control: for system controlled by a duty signal it is possible to force thermo-off by the duty signal itself. When the duty signal becomes lower than 8% of the full range of the signal, the system will be turned to thermo-off condition. When the duty signal becomes higher than 14% of the full range, the system will be turned to thermo-on condition.

Duty Input	(0-5V)	<0.4V	≥0.7V	0.7V	1.0V	1.2V	1.5V	1.8V	2.0V	2.3V
	(0-10V)	<0.8V	≥1.4V	1.4V	2.0V	2.4V	3.0V	3.6V	4.0V	4.6V
	(4-20mA)	<5.28mA	≥6.24mA	6.24mA	7.20mA	7.84mA	8.80mA	9.76mA	10.40mA	11.36mA
Capacity(% of Normal)		Thermo-Off	Thermo-On	40%	45%	50%	55%	60%	65%	70%
Duty Input	(0-5V)	2.6V	2.8V	3.1V	3.3V	3.6V	3.9V	4.1V	4.4V	4.7V
	(0-10V)	5.2V	5.6V	6.2V	6.6V	7.2V	7.8V	8.2V	8.8V	9.4V
	(4-20mA)	12.32mA	12.96mA	13.92mA	14.56mA	15.52mA	16.48mA	17.12mA	18.08mA	19.04mA
Capacity(% of Normal)		75%	80%	85%	90%	95%	100%	105%	110%	120%

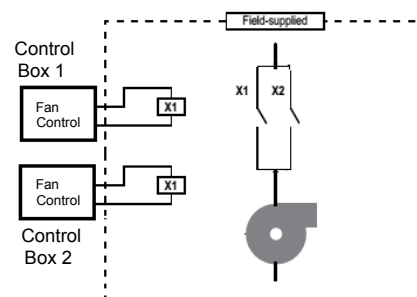




- #### (4) Multi Connection application for one large capacity AHU

-

wire to the fan motor



- 11

3 Transportation and Handling

WARNING

- Do not perform installation work without referring to Installation Manual. If the instructions are not followed, it may result in a water leakage, electrical shock, fire, or injury from falling of the AHU connection kit.
- Do not step or put any material on the AHU connection kit.
- Do not install the AHU connection kit where electromagnetic wave is directly radiated to the control box or expansion valve box. Install the expansion valve kit at least 9.8ft.(3m) away from the electromagnetic wave radiator.
- Install a noise filter when noise is emitted from power supply .
- Do not install the AHU connection kit where generation, flowing, staying or leakage of flammable gas may occur.
- When the false ceiling contains high humidity, dew condensation water may occur on the outer surface of the expansion valve box while cooling operation. In this case, utilize the insulation on the outer surface of the expansion valve box.

3.1 Transportation

- (1) Transport the product to the installation location without removing any packing material.
- (2) Do not put any material on the AHU connection kit when transporting.

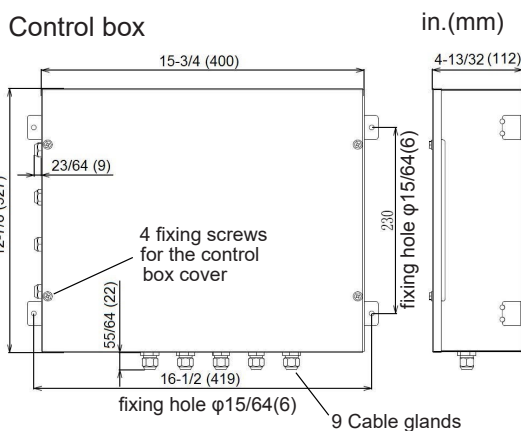
3.2 Installation Location

- (1) Installation methods are selectable according to the space .
- (2) Follow the arrow direction on the expansion valve box for installation.
- (3) Keep the distance between the heat exchanger of AHU and the expansion valve box for the piping length up to 16.4ft.(5m). Also the elevation difference between the heat exchanger of AHU and the expansion valve box must be no more than 6.6ft.(2m).
- (4) Check the ceiling slab is strong enough. If the ceiling slab is too weak to support the weight of the AHU connection kit, noise and vibration may occur.
- (5) Secure proper space around the AHU connection kit for operation and maintenance work. Also a service access door should be prepared in order to remove the AHU connection kit without getting rid of the ceiling plate.
- (6) Select a suitable and convenient location for the refrigerant piping connection.
- (7) Do not install the AHU connection kit in a kitchen where vapor or mist flows. Dew condensation water may occur on the

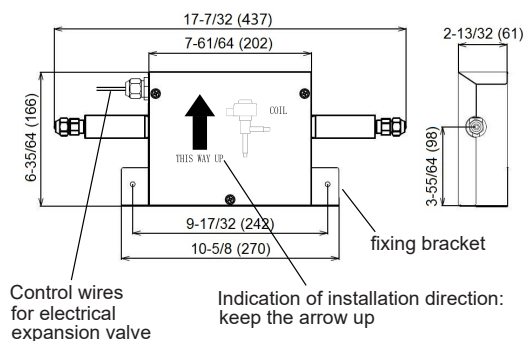
expansion valve box while cooling operation. In this case, utilize the insulation.

- (8) The sound of refrigerant running through the expansion valve box may be heard. Therefore install the expansion valve box where the sound will not leak such as in the false ceiling of a hall way.
- (9) Use ceiling material with sound-proof such as plaster board.

3.3 Dimension Data

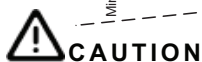
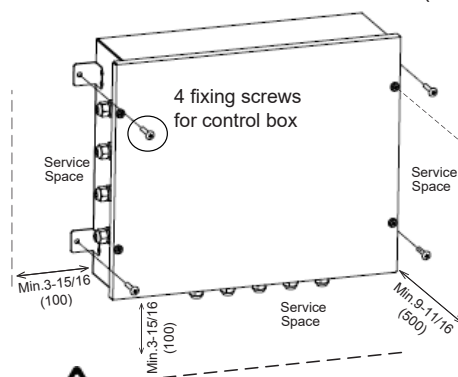


Expansion valve box



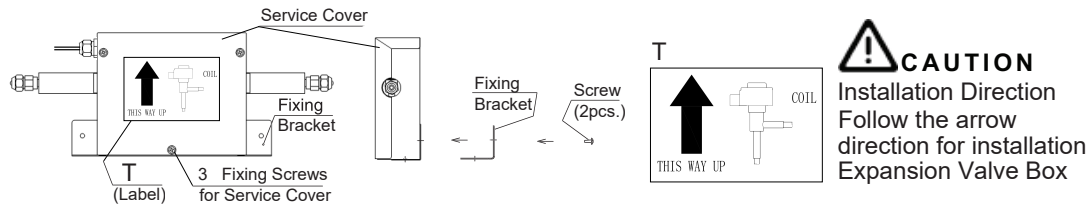
3.4 Installation Method

Control box

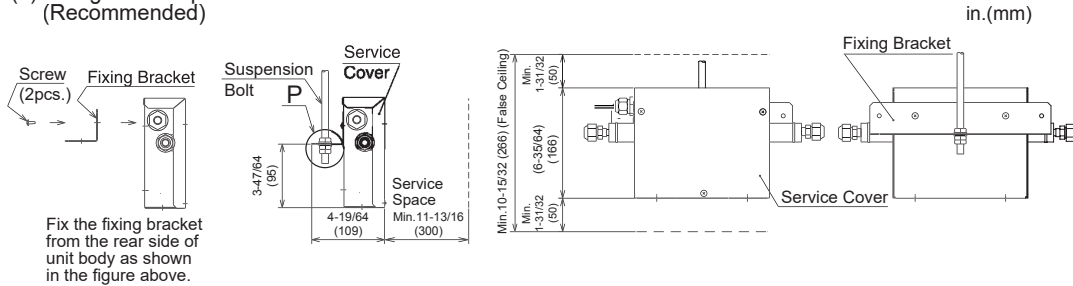


Check to ensure the fixing screws and wall has sufficient strength to hang the control box.

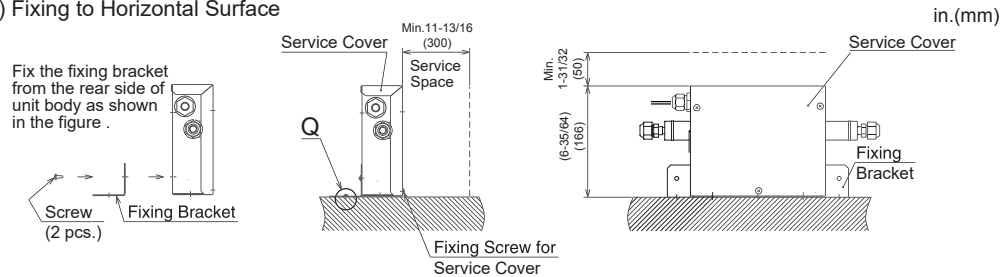
Expansion valve box



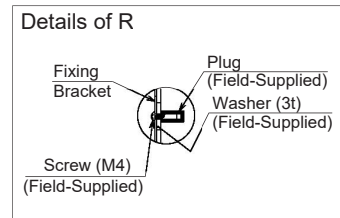
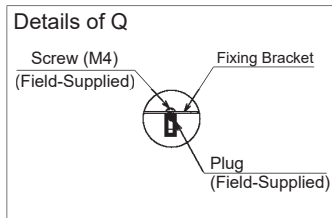
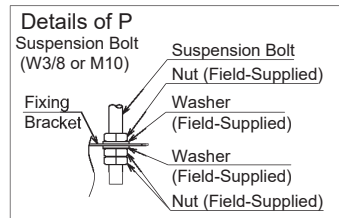
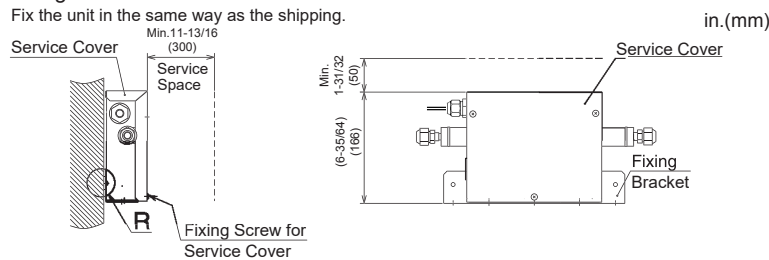
(1) Fixing with Suspension Bolt (Recommended)



(2) Fixing to Horizontal Surface



(3) Fixing to Vertical Surface



CAUTION

Check to ensure the suspension bolt, fixing screws and plugs has sufficient strength to hang the expansion valve box.

NOTES:

1. In case a false ceiling is 10-15/32 in.(266mm) and more, install the unit according to (1) "Fixing with Suspension Bolt".
2. Ceiling should be strong enough to avoid vibration and noise.
3. Perform piping and wiring connection work inside of the false ceiling after suspending the unit. Especially as for the existing ceiling, perform piping and wiring work to the connecting positions for the pipe and wirings before suspending the unit.
4. Keep a service space and install a service access door in order to remove the service cover.
5. When refrigerant piping connection work at field site, pay attention to the connecting direction of the expansion valve box. according to the arrow of the label as shown in the figure T.

3.5 Thermistor Installation

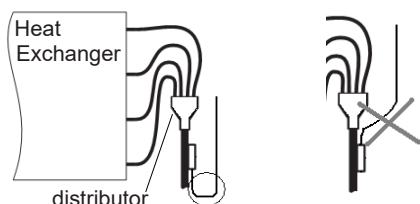
◆ Liquid and gas pipes thermistors

Two type thermistors are supplied inside the control box. The purpose and identification of each one is as follow:

Item	PCB socket / Thermistor connector color	PCB socket number	Thermistor length/ ft.(m)
Liquid pipe thermistor	Black	THM3	32.8 (10)
Gas pipe thermistor	Yellow	THM5	32.8 (10)

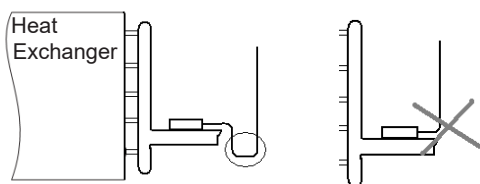
Location of the thermistor of Liquid pipe thermistor:

Install the thermistor in the coldest liquid line point prior the distributor.



Location of the thermistor of Gas pipe thermistor:

Install the thermistor at the outlet of the heat exchanger as close as possible to the heat exchanger .

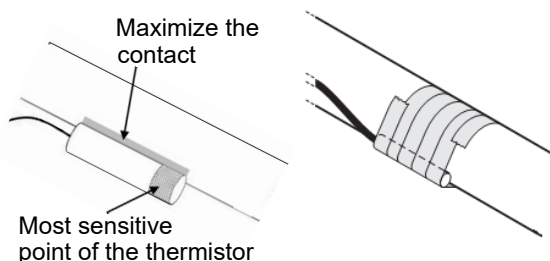


⚠ CAUTION

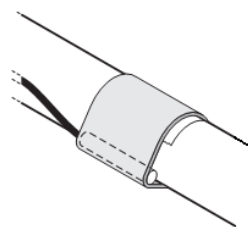
- Put the thermistor cable slightly down to avoid water accumulation on top of the thermistor and add a pull-relief to the thermistor cable to avoid strain on the thermistor cable .
- In case that the thermistors supplied with AHU Connection Kit are not long enough, please make sure that the length extension is properly done avoiding the sensing distortion and that the joint is properly insulated and waterproof to avoid any electrical failure.

Fixing the thermistor:

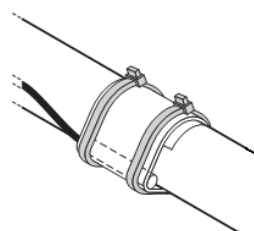
- 1 Fix the thermistor with insulating aluminum tape (field-supplied) in order to ensure a good heat transference. Make good contact between thermistor and pipe.



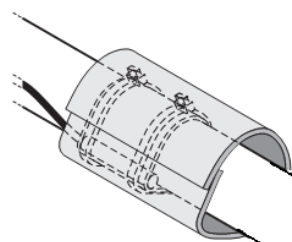
- 2 Put the insulating tape (field-supplied) around the thermistor in order to avoid loosening of the thermistor after some years.



- 3 Fasten the thermistor with 2 cord clamps (field-supplied).



- 4 Insulate the thermistor with the insulation sheet (field-supplied).



Air thermistor

Two air thermistors are supplied inside the control box. The purpose and identification of each one is as follow:

Item	PCB socket / Thermistor connector color	PCB socket number	Thermistor length/ ft.(m)
Inlet air thermistor	Blue	THM1	32.8 (10)
Outlet air thermistor	Red	THM2	32.8 (10)

Install in location where the effects of heat sources such as heat exchangers and heaters, etc. are minimized as far as possible and inlet / outlet air temperature can be measurable as shown in Fig.2.1.

⚠ CAUTION

- In case that the thermistors supplied with AHU Connection Kit are not long enough, please make sure that the length extension is properly done avoiding the sensing distortion and that the joint is properly insulated and waterproof to avoid any electrical failure.
- Fix the thermistors securely with cord clamps in proper place.

4 Refrigerant Piping Work

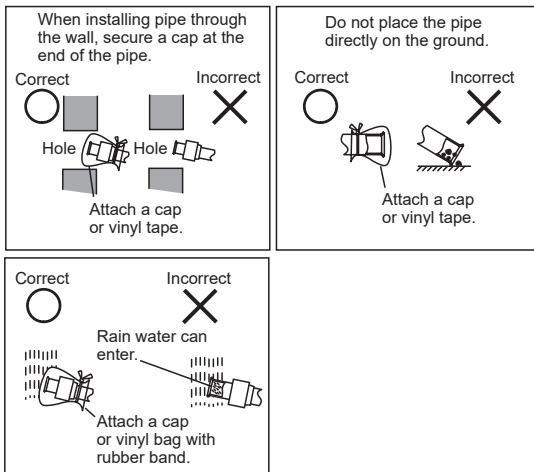
Connect the Expansion Valve Box to the liquid pipe as shown in Fig.2.1.

Limitation of Installation refers to chapter 2.4.

4.1 Piping Materials

- (1) Prepare locally-supplied refrigerant pipes.
- (2) Select clean copper pipes. Make sure there is no dust and moisture inside of the pipes. Blow the inside of the pipes with nitrogen or dry air, to remove any dust or foreign materials before connecting pipes. Do not use any tools such as a saw or a grinder, which produce a lot of swarf.

● Cautions for Refrigerant Pipe Ends



(3) Pipe size of Expansion Valve Box.

Capacity	Pipe Size	Liquid/ ϕ in.(mm)
19 kBtu/h(2HP)		1/4 (6.35)
36-96 kBtu/h(4-10HP)		3/8 (9.53)
114-287 kBtu/h(12-30HP)		1/2 (12.7)

4.2 Piping Connection

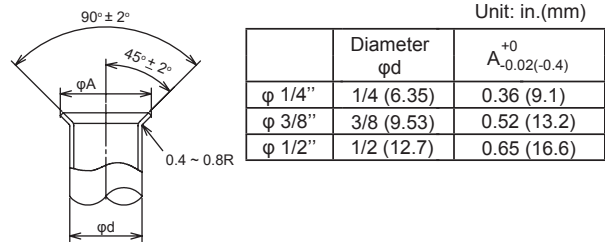
- (1) Position of piping connection refers to chapter 3.3.
- (2) When tightening the flare nut, use two spanners as shown in the figure. Ensure that no refrigerant leakage occurs.
- (3) Support the pipes with clearance towards the axis to avoid thermal stress.
- (4) Ceiling material should be strong enough. Abnormal noise may be heard due to piping vibration.
- (5) After connecting the refrigerant piping, seal the refrigerant pipes by using the insulation material as shown in the figure (field-supplied).

! CAUTION

Do not fasten flare nut hard. It may cause breakage with aged deterioration and refrigerant leakage. Use a specified flare nut.

Regarding refrigerant piping work, vacuum pumping work and additional refrigerant charge, refer to the outdoor unit "Installation & Maintenance Manual".

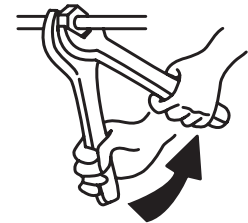
• Flaring Dimension



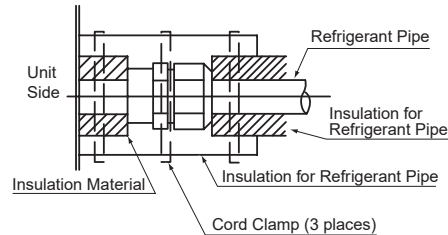
• Required Torque

Pipe Size/in.(mm)	Tightening Torque/ft-lbs(N·m)
ϕ 1/4(6.35)	15(20)
ϕ 3/8(9.53)	30(40)
ϕ 1/2(12.7)	44(60)

• Two-Spanner Work



• Insulation on Pipes



! DANGER

Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.

5 Electrical Wiring

WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Protect the wires, drain pipe, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and at the worst, a fire will occur.
- Tighten screws according to the following torque.
M3.5: 0.9 ft·lbs (1.2 N·m)
M5: 1.5~1.8 ft·lbs (2.0~2.4 N·m)

CAUTION

- Wrap the accessory packing around the wires, and plug the wiring connection hole with the seal material to protect the product from any condensate water or insects.
- Tightly secure the wires with the cord clamp.
- Secure the cable of the remote control switch using the cord clamp.

5.1 General Check

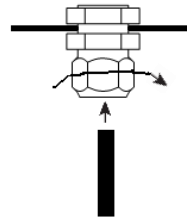
- (1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data given in "Technical Catalog I". Make sure that the components comply with National Electrical Code (NEC).
- (2) Check to ensure that the power supply voltage is within $\pm 10\%$ of the rated voltage.
- (3) Check the capacity of the electrical wires. If the power source capacity is too low, the system cannot be started due to the voltage drop.
- (4) Check to ensure that the ground wire is connected.
- (5) Power Source Main Switch
Install a multi-pole main switch with a space of $9/64$ in. or more between each phase.

5.2 Electrical Wiring Connection

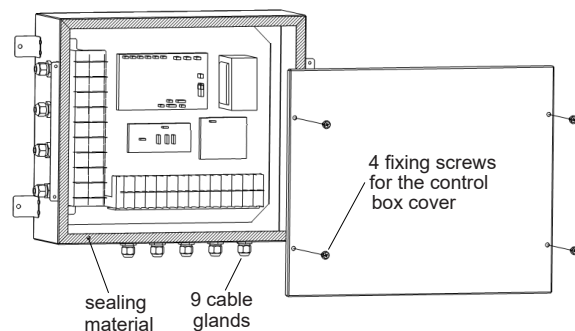
- Connect the wires to the terminal board according to the wiring diagram.
- Following the local codes and regulations when performing the electrical wiring.
- Use shielded wires for intermediate wiring to protect the units from noise obstacle at length of less than 984ft.(approximately 300m) and size in compliance with local codes.
- Run through the cables using conduit tube, and Completely seal the end of conduit tube with sealing materials.
- Use an ELB (Electric Leakage Breaker). If not used, it will cause an electric shock or a fire.

CAUTION

- Pay attention to the connection of the operating line. Incorrect connection may cause PCB failure.
- Use the attached waterproof cable gland to secure the wires firmly.
- Cable gland diameter specification: $15/64$ in.(6.0mm, min) to $25/64$ in.(10.0mm, max). If needed, install additional tube insulation or wind with insulation tape around the wire to make the wire thicker.
- After passing the wires through the cable gland, close the nut firmly in order to ensure a good pull relieve and water protection.
- For unused cable gland, insert the proper short cable into the cable gland and close the opening firmly as shown in the following figure to ensure the control box waterproof.

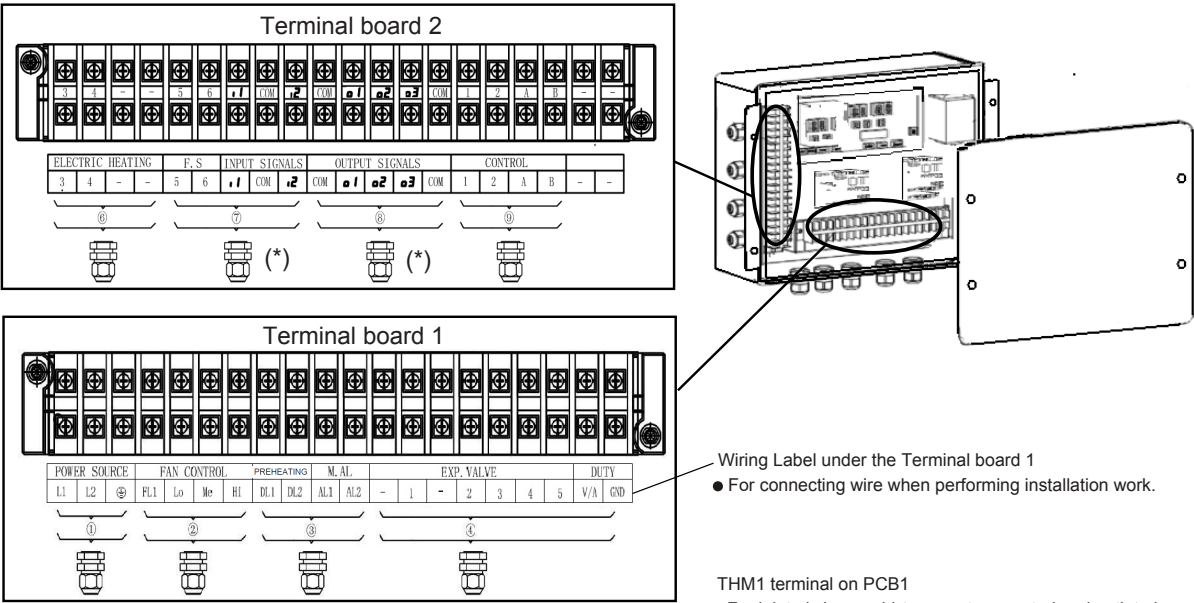


- Fixing the 4 screws for the cover of the control box securely to ensure the control box waterproof after installation.
- Do not break sealing material on the control box during operation.



5.3 Control Box Terminal Board

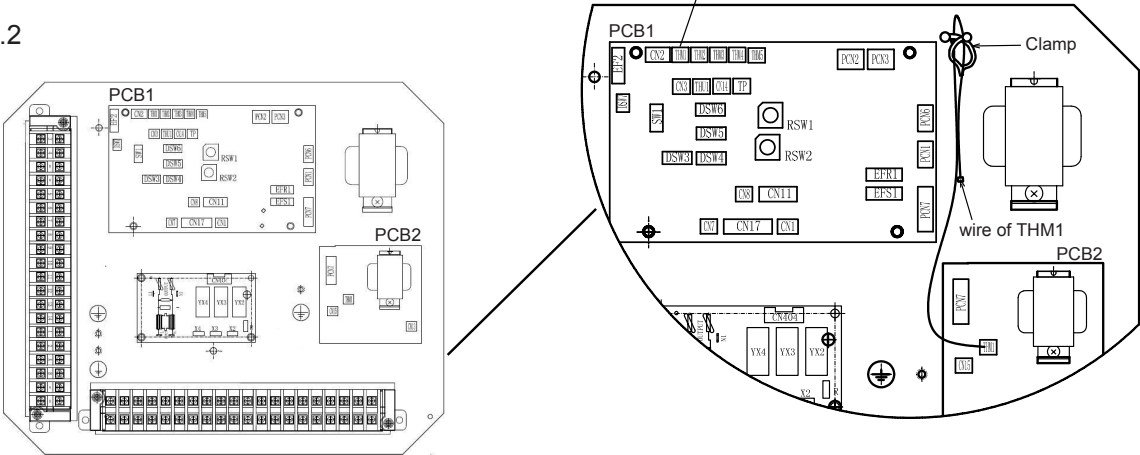
Fig.1



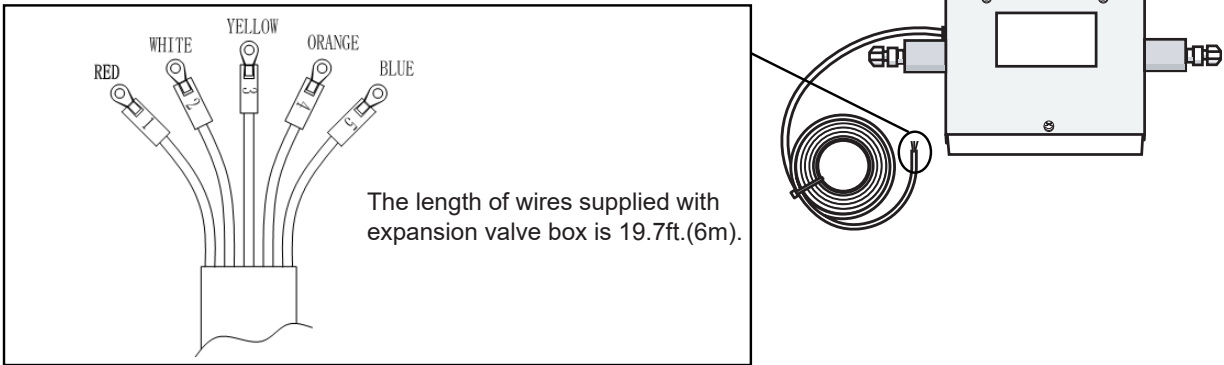
NOTE

(*):These cable glands also for thermistors

Fig.2



5.4 Expansion Valve Box



5.5 Terminal Board Connection and Remarks

Terminal board 2

Terminal	Description	Connect to	Type of cable	Cross section /AWG(mm²)(*)	Quantity of cable	Maximum length /ft.(m)	Specifications
3, 4	Electric heating signal	Relay for electric heater	Sheathed PVC cable	20(0.5)	2	32.8 (10)	Digital output, 12 V DC, maximum 33 mA
(1) 5, 6	FS: Flow switch	Float switch	Sheathed PVC cable	20(0.5)	2	32.8 (10)	Digital input ,Free contact between terminals 5 and 6 ,12 V DC maximum 1.2 mA
(2) 1, COM	Input Signals 1	External controller	Sheathed PVC cable	20(0.5)	2	164.0 (50)	Digital input ,Free contact between terminals 1 and COM ,12 V DC maximum 10 mA
(2) 2, COM	Input Signals 2						Digital input ,Free contact between terminals 2 and COM ,12 V DC maximum 10 mA
(3) 1, COM	Output Signals 1	External controller	Sheathed PVC cable	20(0.5)	2	164.0 (50)	Digital output, 12 V DC, maximum 33 mA
(3) 2, COM	Output Signals 2						
(3) 3, COM	Output Signals 2						
1, 2	(4) Transmission wiring to outdoor and indoor unit	Outdoor and indoor unit	Shielded Twist Pair Cable	18(0.82)	2		
A, B	(4) Transmission wiring to remote controller	Remote controller					
THM1	(5) Inlet air thermistor (*)		Sheathed PVC cable	20(0.5)	2	32.8 (10)	THM1 on PCB1
THM2	(5) Outlet air thermistor						THM2 on PCB1
THM3	(5) Liquid pipe thermistor						THM3 on PCB1
THM5	(5) Gas pipe thermistor						THM5 on PCB1

Terminal board 1

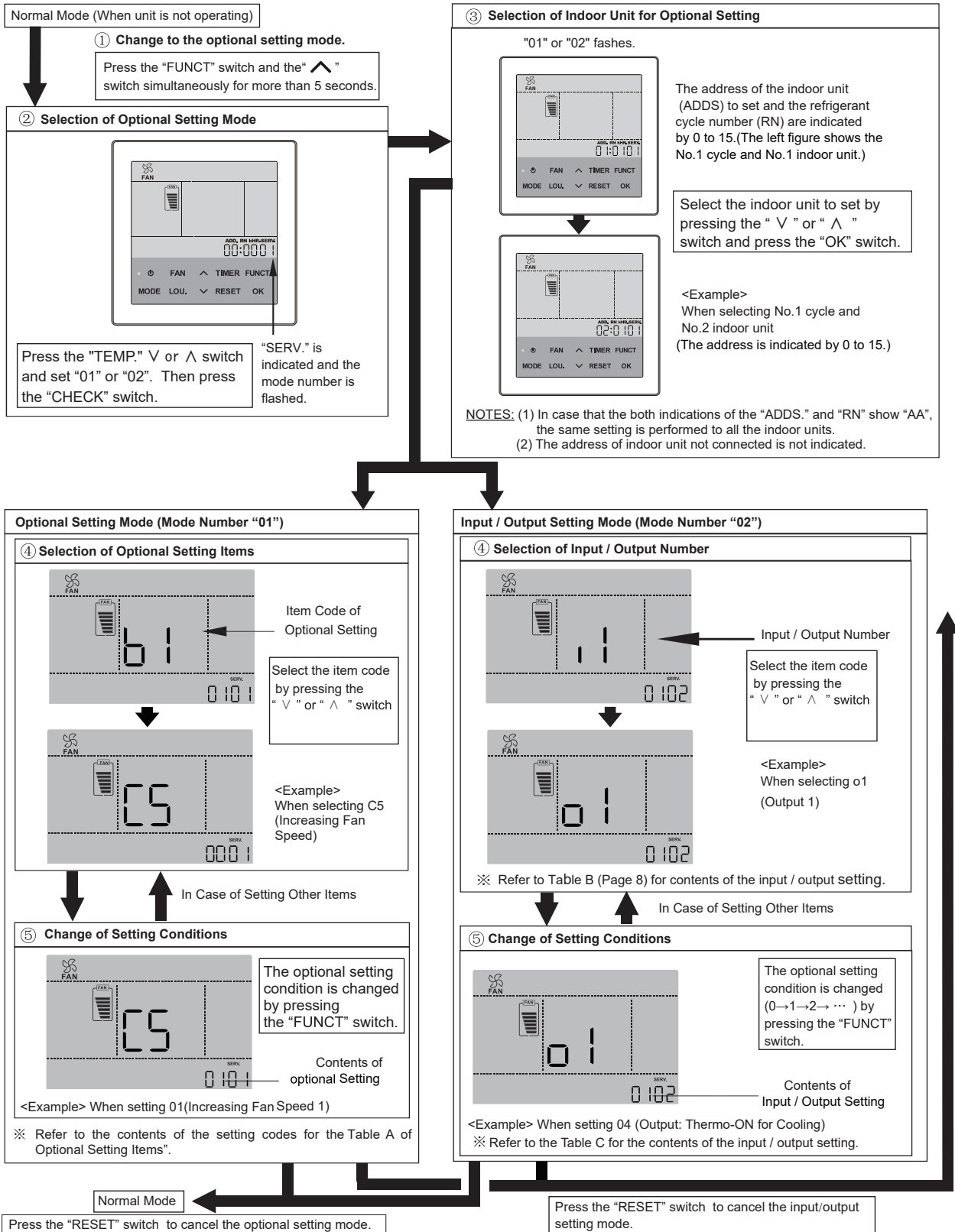
Terminal	Description	Connect to	Type of cable	Cross section /AWG(mm²)(*)	Quantity of cable	Maximum length /ft.(m)	Specifications
L1, L2, earth	Power supply	Power source	H05RN-F	13(2.5)	3		Power source: 208/230V ~ 60Hz maximum current 5.0 A
(6) FL1, Lo, Me, Hi	Fan Control signal by remote controller FL1:N-Neutral phase terminal Lo:Low fan speed signal Me:Medium fan speed signal Hi:High fan speed signal	Relay for AHU fan	Sheathed PVC cable	18(0.82)	4		Signal output, compatible with AC power source, maximum 2.5 A
(7) DL1,DL2	Electrical preheating	Electrical preheater	Sheathed PVC cable	18(0.82)	2		Signal output, compatible with AC power source, maximum 1.5 A
(8) AL1,AL2	M.AL:Fan motor alarm signal	Overload(thermal) protector for fan motor	Sheathed PVC cable	18(0.82)	2		Signal input ,Free contact between terminals AL1 and AL2 ,compatible with AC power source, maximum 2.5 A
(9) 1~5	EXP.VALVE:connecting expansion valve wires	Expansion valve box	Sheathed PVC cable	20(0.5)	5	32.8 (10)	Digital output, 12 V DC
(10) V/A,GND	Duty signal	Field supplied controller	Sheathed PVC cable	20(0.5)	2		Digital input, 0-10 V DC,0-5V DC,4-20mA

- (1) Alarm occurs and PREHEATING signal (DL1, DL2) outputs ON automatically if the FS terminal (5, 6) of flow switch signal is open. The terminal is short-circuited with a jumper before shipment, please keep short-circuited state.
- (2) Definition of Input Signals refer to chapter 6.2. Make the wires for input signals as short as possible. DO not install the wires along the power supply wire of AC 208V~AC398V. Install the wires separately at a distance of more than 1ft. (approximately 300mm). If you install the wires along the power supply wire, insert the wires in a metal conduit tube and ground one end of a wire.
- (3) Definition of Output Signals refer to chapter 6.2. Make sure the allowable current in the limitation.
- (4) Use a shielded cable for transmission circuit and connect it to ground.
- (5) Thermistor cable should be located at least 2 in.(approximately 50mm) away from power supply wires. Not following this guideline may result in malfunction due to electrical noise.
- (6) Short-circuit the terminals of Lo, Me, Hi and connect the terminal Hi for one tap of fan motor. Short-circuit the terminals of Lo, Me and connect the terminals Hi, Me for two taps of fan motor.The terminals of Lo, Me, Hi are short-circuited with jumpers before shipment.
- (7) The PREHEATING signal (DL1, DL2) outputs will be turned ON when ambient temperature is below 0°C.
- (8) Alarm occurs if the M.AL terminal (AL1, AL2) of fan motor alarm signal is open. The terminal is short-circuited with a jumper before shipment. Be careful to high voltage(over 230V) impressed to the line.
- (9) Number links from 1 to 5 must match between the terminals of EXP.VALVE and the wires of the expansion valve box.In case that the wires supplied with expansion valve box are not long enough, please make sure that the length extension is properly done avoiding the sensing distortion and that the joint is properly insulated and waterproof to avoid any electrical failure.
- (10) Duty signal terminal(V/A,GND) connects to the field supply controller.
- (*) For Duty signal control insert the wire of THM1 from PCB2, referring to Fig.2 in chapter 5.3 .

6 Optional Setting and Input / Output Setting

Perform the following instructions by means of the Remote controller supplied with AHU CONNECTION KIT for Optional Setting and Input / Output Setting.

6.1 Optional Setting and Input / Output Setting by Remote controller



6.2 Optional Setting and Input / Output Setting

• Table A Optional Setting Items for AHU CONNECTION KIT

No.	Items	Optional Function	Individual Setting	Setting Condition	Contents
1	b1	Heating Temperature Compensation	○	00 01 02	Standard [Set Temp. 96.8°F(36°C)] Removal [Set Temp.] Set Temp. 36°F (+2°C *1)
2	b2	Circulator Function at Heating Thermo-OFF	○	00 01	Not Available Available
3	b3	Enforced 3 Minutes Minimum Operation Time of Compressor	○	00 01	Not Available Available
4	b4	Change of Filter Cleaning Time	○	00 01 02 03 04	Standard 100 hours 1,200 hours 2,500 hours No Indication
5	b5	Fixing of Operation Mode	×	00 01	Not Available Available
6	b6	Fixing of Setting Temperature	×	00 01	Not Available Available
7	b7	Fixing of Operation as Exclusive Cooling Unit	×	00 01	Not Available Available
8	b9	Fixing of Fan Speed	×	00 01	Not Available Available
9	bb	Cooling Temperature Compensation	○	00 01 02	E1: 00 Standard (Set Temp.) Set Temp. 30°F (-1°C) Set Temp. 28°F (-2°C)
					E1: 01 Set Temp. 22°F (-6°C) Set Temp. 24°F (-4°C) Set Temp. 28°F (-2°C)
10	C5	d7 setting control	○	00 01 02	Cooling and heating Available Only Cooling Available Only heating Available
11	C6	Hi Speed at Heating Thermo-OFF	○	00 01	Not Available Available
12	C8	Thermistor of Remote Control Switch	○	00 01 02	Control by Indoor Suction Thermistor Control by Thermistor of Remote Control Switch Control by Average Value of Indoor Suction Thermistor and Thermistor of Remote Control Switch
13	Cb	Selection of Forced Stoppage Logic	×	00 01	Forced Stoppage Input: A Contact Forced Stoppage Input: B Contact
14	CF	Compensation of thermostat temperature setting for Outlet air temperature control	○	00 01 02	32°F (0°C) 36°F (2°C) 41°F (5°C)
15	d1	Power Supply ON/OFF 1	○	00 01	Not Available Running while Power supply ON
16	d3	Power Supply ON/OFF 2 Only for the unit been running before Power OFF	○	00 01	Not Available Running while Power supply ON
17	d4	Prevention for Cooling Discharge Air Temp. Decrease	○	00 01	Not Available Available
18	d5	Prevention for Heating Discharge Air Temp. Decrease	○	00 01	Not Available Available
19	d7	Compensation of the outlet air temperature for outlet air temperature control mode	○	00 01 02 03 04 05 06 07	Cooling Heating 32°F (0°C) 32°F (0°C) 28°F (-2°C) 36°F (+2°C) 24°F (-4°C) 40°F (+4°C) 22°F (-6°C) 42°F (+6°C) 36°F (+2°C) 28°F (-2°C) 40°F (+4°C) 24°F (-4°C) 42°F (+6°C) 22°F (-6°C) 42°F (+6°C) 22°F (-6°C)

No.	Items	Optional Function	Individual Setting	Setting Condition	Contents
20	E1	Capacity Control Mode	○	00 01 02	Inlet air (room air) temperature control Outlet air temperature control Duty signal control
21	E4	Type of Duty Signal	○	00 01 02	0-10V 0-5V 4-20mA
22	E6	Indoor Fan Operation Time After Cooling Operation Stoppage	○	00 01 02	Not Available 60 min. 120 min.
23	Eb	Fan Operation Control at Cooling Thermo-OFF	○	00 01 02	Not Available LOW SLOW
24	Eb	Relative humidity (Hs) setting during heating operation	○	00 01 02	Hs=35% Hs=40% Hs=45%
25	EC	Forced Thermo-ON Stoppage at Cooling	○	00 01	Not Available Available
26	F2	Remote Control Main-Sub Setting	×	00 01	Main Sub

NOTES:

* After at least 3 minutes from the power ON, change the optional setting.

* The optional settings are different according to the indoor and outdoor unit models. Check to ensure that the unit has the optional setting or not.

●Table B Input and Output Number Indications / Terminals / factory-setting

number	Indication ①	Terminals	Remarks	Setting When Shipping	Indication ②
Input1	1	1, COM		Remote Control ON/OFF Function 1	03
Input2	2	2, COM		Cancellation of Commands from Remote Control Switch after Forced Stoppage	06
Output1	01	01, COM		Operation Signal	01
Output2	02	02, COM		Alarm Signal	02
Output3	03	03, COM		Thermo-ON Signal during Heating	06

NOTES:

* After at least 3 minutes from the power ON, change the optional setting.

* Record the setting conditions for each input and output in the "Setting" column of the table.

●Table C Input and Output Settings and Indications

Indication ②	Input	Output
00	Not Set	Not Set
01	Control by Field-Supplied Room Thermostat (Cooling)	Operation Signal
02	Control by Field-Supplied Room Thermostat (Heating)	Alarm Signal
03	Remote Control ON/OFF Function 1	Cooling Operation Signal
04	Remote Control ON/OFF Function 2 (Operation)	Thermo-ON Signal during Cooling
05	Remote Control ON/OFF Function 2 (Stop)	Heating Operation Signal
06	Cancellation of Commands from Remote Control Switch after Forced Stoppage	Thermo-ON Signal during Heating
07	Cooling or Heating Operation Mode Setting	Humidifier ON Signal during Heating
08	(Not Available)	Defrost signal

6.3 Input Setting

6.3.1 Remote Control ON/OFF Function

This function provides a control to stop and start the system from a remote place. Four methods are available by using each signal from a building management system.

The factory-setting is as follows; "Remote Control 1" Signal Input to ,1 , and

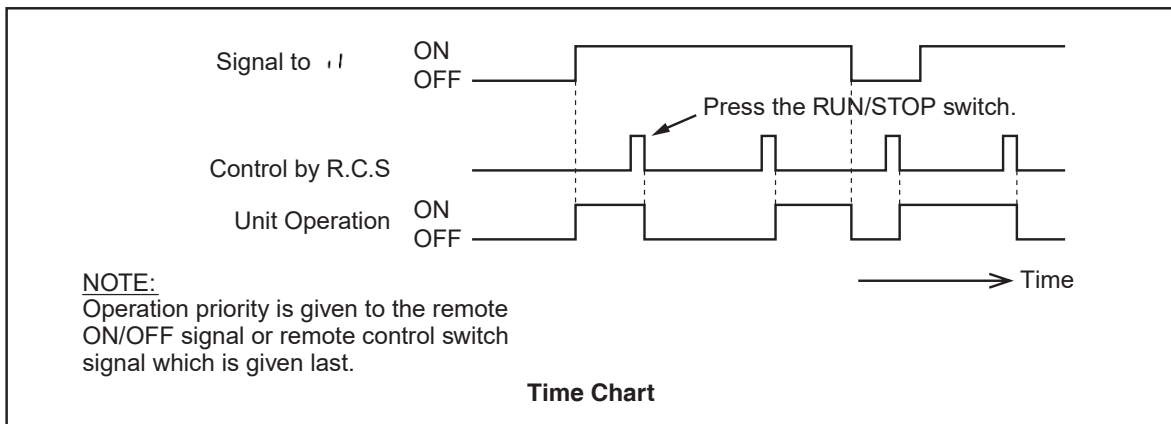
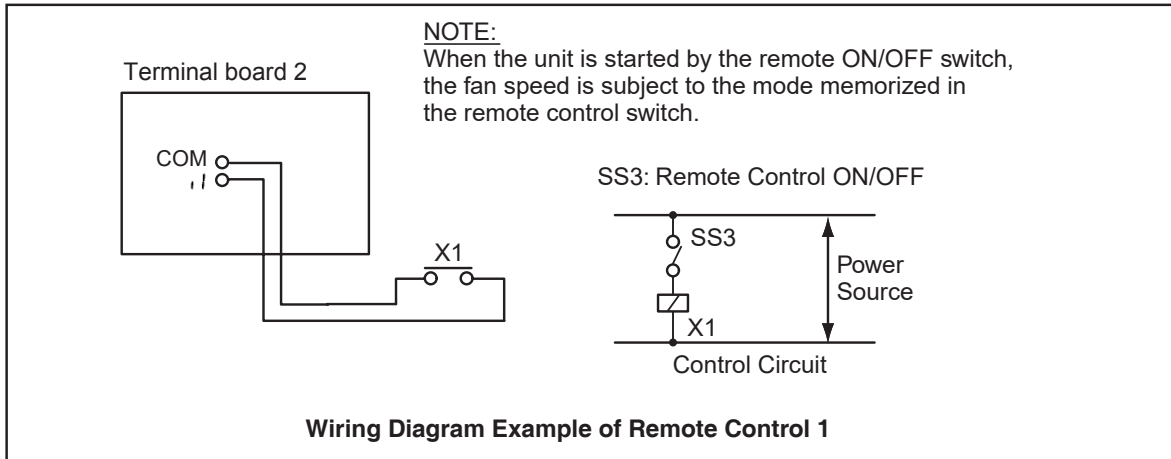
"Cancellation of Commands from Remote Control Switch after Forced Stoppage" Signal Input to ,2 .

In case of using other functions, change the contact setting .

(1) Remote Control ON/OFF Function 1 (Level signal Input) (Setting Indication 03)

This is an ON/OFF function from a remote place by using level signal (or ON/OFF). The basic wiring, time chart are shown below.

(In Case of "Remote Control 1" Signal Input to ,1)



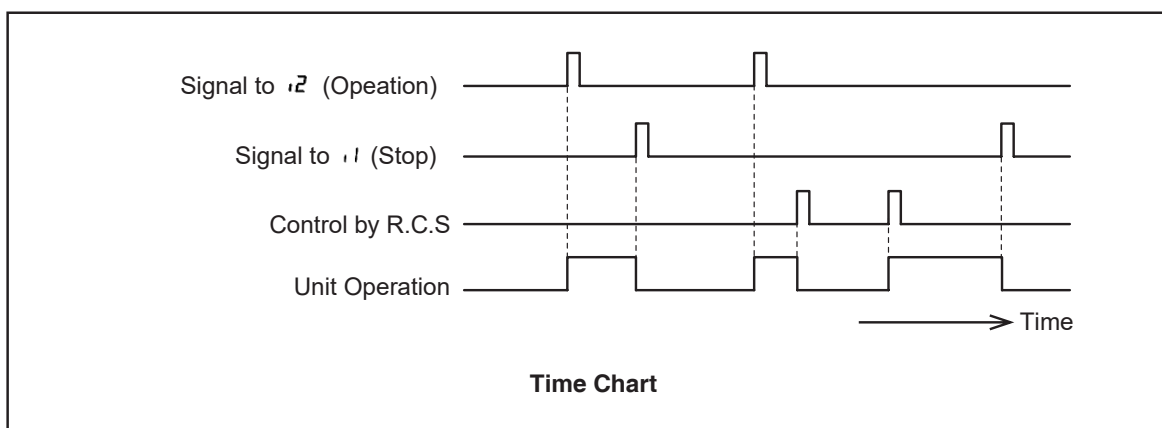
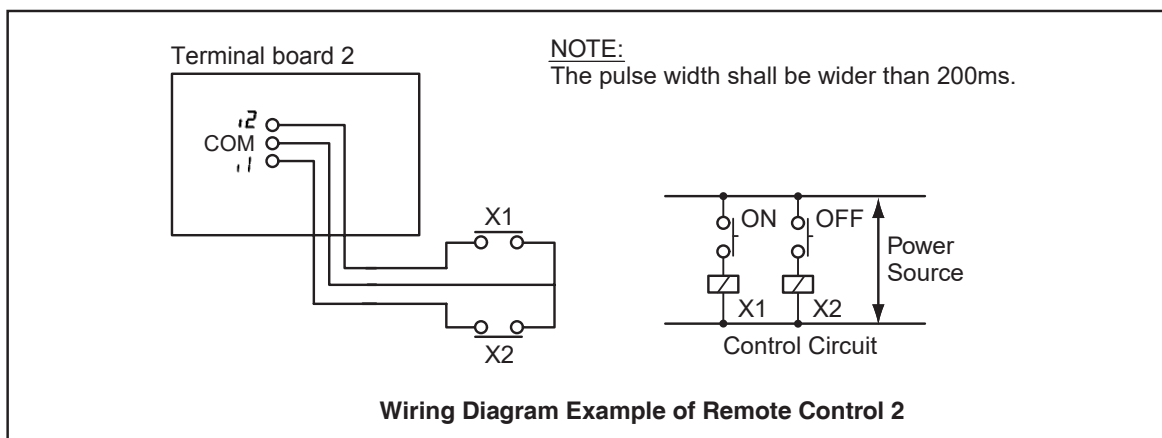
NOTES:

1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.

(2) Remote Control ON/OFF Function 2 (Pulse Signal Input) (Setting Indication 04/05)

This is an ON/OFF function from a remote place by using pulse signal. The basic wiring and time chart are shown below.

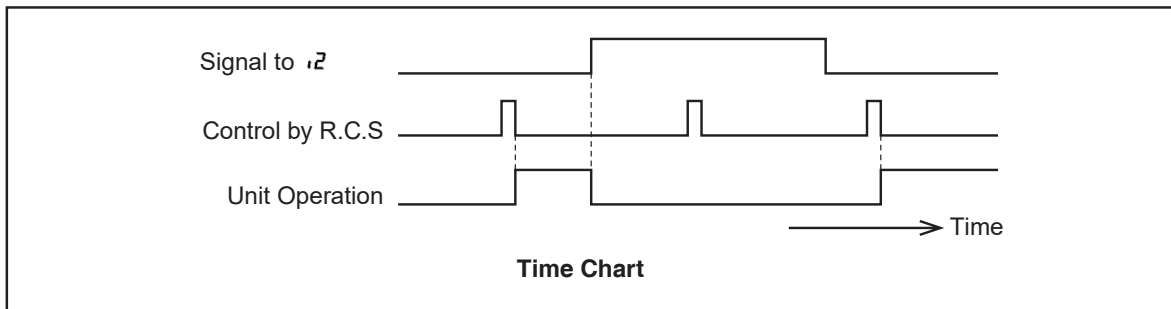
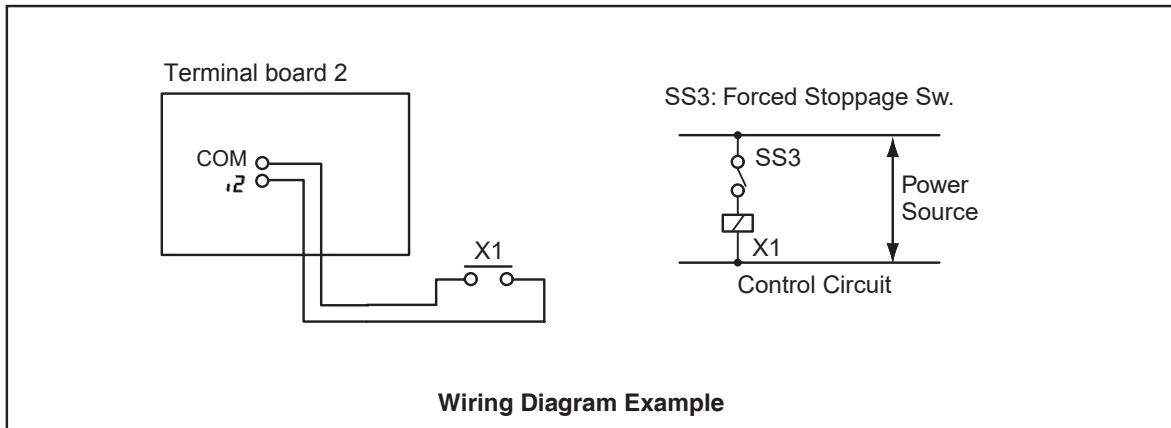
(In case of "ON" signal input to ,12, setting indication 04 and "OFF" signal input to ,1, setting indication 05)



NOTES:

1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.
3. If a signal is input during stoppage, the unit remains unchanged.

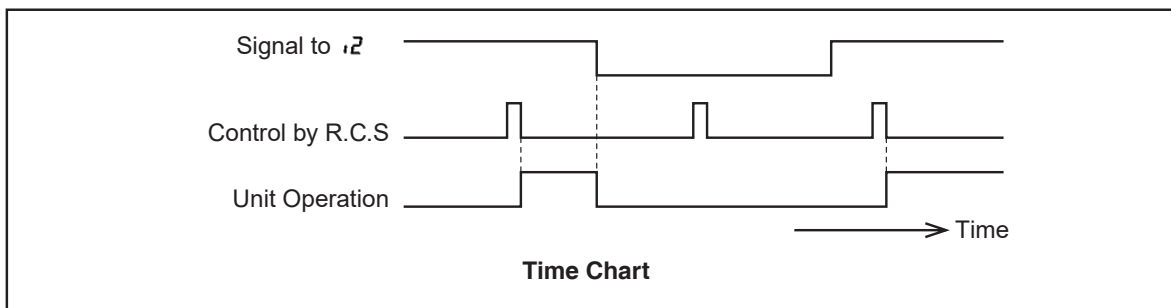
- (3) Cancellation of Commands from Remote Control Switch after Forced Stoppage (Setting Indication 06)
 By using the signal from a building management system, the air conditioners can be stopped and the individual commands from the remote control switch are canceled.
 The basic wiring and time chart are shown below.
 (In Case of "Cancellation of Commands from Remote Control Switch after Forced Stoppage" Input to ,2 ,Setting indication 06)



NOTES:

1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.

At this function, the B contact can be used by the optional setting (chapter 6.2 Table A item Cb (13):01) of the remote control switch. The time chart when using the B contact is shown below.



NOTES:

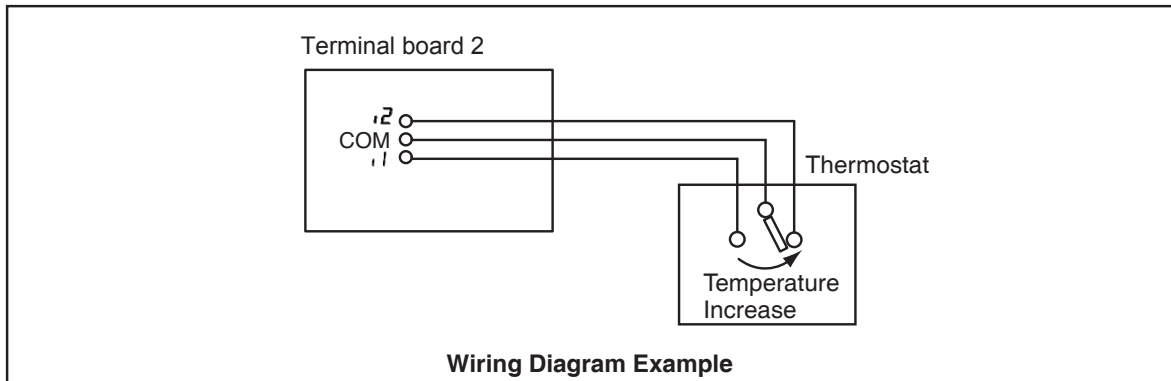
1. Picking up signal within 10 seconds after power supply is turned ON is not available due to initializing of components.
Do not change the signal (RUN/STOP) in this period.
2. Remote Control Switch is required for this function.

6.3.2 Control by Field-Supplied Room Thermostat (Setting Indication 01/02)

In the case that a field-supplied room thermostat instead of the inlet thermistor of the indoor unit is used, connect wires as shown below.

(In Case of "Room Thermostat (Cooling)" Input to ,2 ,Setting indication 01

and "Room Thermostat (Heating)" Input to ,1 ,Setting indication 02)



Operation

Cooling Operation: Compressor is ON by closing terminals ,2
Compressor is OFF by opening terminals ,2

Heating Operation: Compressor is ON by closing terminals ,1
Compressor is OFF by opening terminals ,1

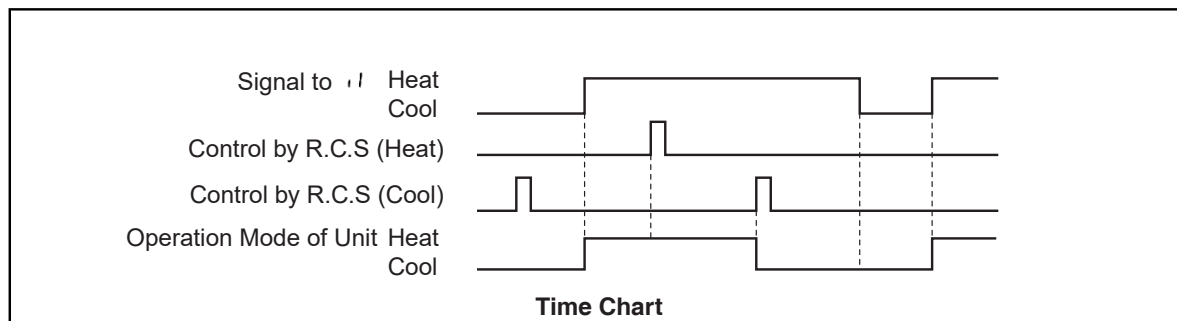
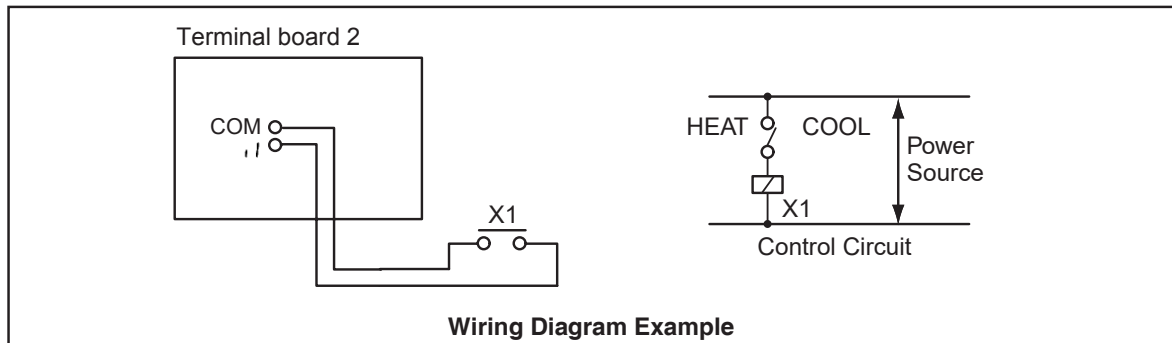
NOTES:

1. When a field-supplied room thermostat is used, select the specified thermostat as below.
Contactor Load: DC12V
Differential: more than 1.5K
2. Do not use a thermostat utilizing mercury.
3. This function can be used together with "6.3.1 Remote Control ON/OFF Function".
4. This function can not be used together with outlet air temperature control mode (the optional setting chapter 6.2 Table A item E1 (20):01 of the remote control switch .
5. This function can not be used together with duty signal control mode (the optional setting chapter 6.2 Table A item E1 (20):02 of the remote control switch .

6.3.3 Cooling or Heating Operation Mode Setting (Setting Indication 07)

By utilizing this function, the cooling or heating operation mode can be changed by giving a contact signal from the outside to the unit. The operation mode is followed by the field-supplied switch or the remote control switch, which is used last.

(In Case of "Cooling or Heating Operation Mode Setting Change by External Input" Signal Input to 11)



NOTES:

1. This function can not be used together with the following functions; "Remote Control ON/OFF Function 2", and "Cancellation of Commands from Remote Control Switch after Forced Stoppage".
2. Remote Control Switch is required for this function.

6.4 Output Setting

(1) Operation Signal (Setting Indication 01)

This function is utilized to pick up the operation signal. By this function, operation signal at a remote place can be checked, or operation at the fresh air intake fan motor can be interlocked. Connect wires as shown below. Please note that the contact of the auxiliary relay "RYa" is closed when this operation signal is given.

(2) Alarm Signal (Setting Indication 02)

This signal is utilized to pick-up activation of safety devices and is normally indicated on the remote control switch. However, this function is not available under abnormal transmission conditions. Connect the wires as shown below. Please note that the contact of auxiliary relay, RYa is closed when one of the safety devices is activated.

(3) Cooling Operation Signal (Setting Indication 03)

This function is utilized to pick up the cooling signal. The contact of RYa is closed when cooling operation signal is ON despite "Thermo-ON" or "Thermo-OFF". Connect the wires as shown below.

(4) Thermo-ON Signal during Cooling (Setting Indication 04)

This function is utilized to pick up the cooling "Thermo-ON" signal of compressor running. Connect the wires as shown below.

The contact of RYa is closed when "THERMOSTAT" is ON during cooling operation mode.

(5) Heating Operation Signal (Setting Indication 05)

This function is utilized to pick up the heating operation signal. The contact of RYa is closed when heating operation signal is ON despite "Thermo-ON" or "Thermo-OFF". Connect the wires as shown below.

(6) Thermo-ON Signal during Heating (Setting Indication 06)

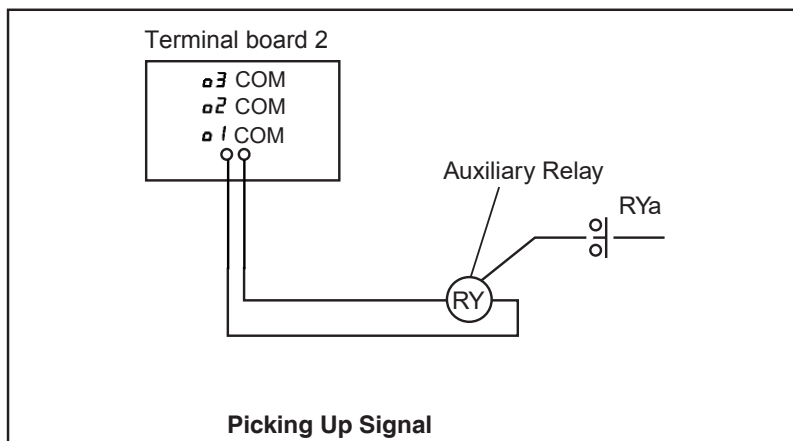
This function is utilized to pick up the heating "Thermo-ON" signal of compressor running to control a circulator or a humidifier. Connect wires as shown below. The contact of RYa is closed when "THERMOSTAT" is ON during heating operation mode.

(7) Humidifier ON Signal during Heating (Setting Indication 07)

This function is utilized to pick up the "Humidifier-ON" signal of to control a humidifier. Connect wires as shown below. The contact of RYa is closed when "Humidifier" is ON during heating operation mode.

(8) Defrost Signal (Setting Indication 08)

This function is utilized to pick up Defrost Signal. Connect wires as shown below. The contact of RY a is closed when Outdoor Unit is processing defrost. This function is only set by **a1** or **a2**.

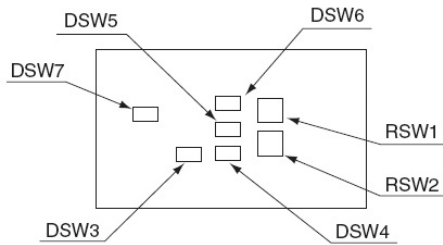


7 Setting of Dip Switches

PCB layout referring to Fig.2 in chapter 5.3.

Dip Switches ON PCB1

(A) Position of Dip Switches



(B) The PCB in the unit is equipped with 2 rotary switches and 6 dip switches. Before testing unit, set these dip switches according to the following instructions. Unless these dip switches are set in the field, the unit can not be operated.

- (1) Unit No. Setting (RSW1&DSW6)
Setting is required. Set the unit No. of all units respectively and serially by following setting position shown in the table below. Numbering must start from "1" for every outdoor unit.

Unit No. Setting

DSW6 (Tens Digit)	RSW1 (Units Digit)	Ex.) Set at No.16 Unit
Before shipment, DSW6 and RSW1 are set to "0". Max.64 units are available to set when all the equipment to be connected are corresponding to Hi-NET II. Max.16 units when the units corresponding/ non-corresponding to Hi-NET II are combined.		Set No.1 Pin ON Set at "6"

- (2) Unit Model Code Setting (DSW4)
No setting is required.
Setting the model code of the indoor unit.



- (3) Capacity Code Setting (DSW3)

DSW3 must be set corresponding to the nom heat exchanger Capacity of the AHU at field site according to chapter 2.2 .

- (4) Refrigerant Cycle No. Setting (RSW2&DSW5)
Setting is required. Setting positions before shipment are all OFF.

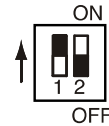
Refrigerant Cycle No. Setting

DSW5 (Tens Digit)	RSW2 (Units Digit)	Ex.) Set at No.5 Cycle
Before shipment, DSW5 and RSW2 are set to "0". Max.64 cycles are available to set when all the equipment to be connected are corresponding to Hi-NET II. Max.16 cycles when the units corresponding/ non-corresponding to Hi-NET II are combined.		Set All Pins OFF Set at "5"

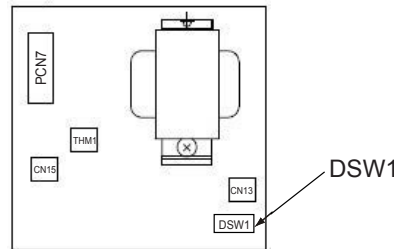
- (5) DSW7
*Factory Setting



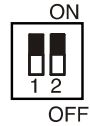
*No.1 Pin: Fuse Recover
When fuse is cut,
turn No.1 Pin ON.



Dip Switches ON PCB2



- DSW1
*Factory Setting



No.1 and No.2 Pins of DSW1 shall be turn off when Multi Connection application.



NOTE

- The "■" mark indicates position of dip switches. Figures show setting before shipment.

CAUTION

Before setting dip switches, firstly turn OFF power source and set the position of the dip switches. If the switches are set without turning OFF the power source, the switches can not function.

8 Test Run

Test run should be performed according to "Installation & Maintenance Manual" of the outdoor unit.

WARNING

- Do not operate the system until all the check points have been cleared.
 - (A) Check to ensure that the electrical resistance is more than 1 megohm, by measuring the resistance between ground and the terminal of the electrical parts. If not, 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) Check to ensure that the switch on the main power source has been ON for more than 12 hours, to warm the compressor oil by the crankcase heater.
- 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 are heated higher than 194°F (90°C).
 - (B) DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES). It will cause a serious accident.

9 Warranty Policy

We can be held responsible for the quality and performance of the AHU CONNECTION KIT we supply. However, we cannot be held responsible for the performances, operations and machine controls of the entire AHU system which incorporates our AHU CONNECTION KIT, nor for any damages to the entire system, the AHU main body or the outdoor units caused by connected AHU with wrong specification or wrong usage of AHU.

- Select an appropriate AHU with appropriate specifications and compatibility with regulations. Match with right AHU CONNECTION KIT and outdoor units, if not the performance, operation reliability and Lifetime of entire AHU system may be influenced.
- The temperature of the heat exchanger inside the AHU may become down to -4°F (-20°C) and the discharge air temperature may become 32°F (0°C) during cooling operation. The components and materials inside the AHU shall be compatible with the temperature. Note that dew condensation on the heat exchanger, AHU main body and the refrigerant pipe occurs. Drain and insulate the AHU and pipe properly.
- The temperature of the heat exchanger inside the AHU may become up to 248 °F (120°C) and the discharge air temperature may become 140°F (60°C) during heating operation. The components and materials inside the AHU shall be compatible with the temperature.
- The performance may not reach due to outside temperature limitation and protection for outdoor units.

