



**LG**  
Life's Good

**INSTALLATION MANUAL  
FOR LG AIR HANDLER UNIT (AHU)  
COMMUNICATIONS KIT**



**AHU Model Number: PAHCMR000**

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# SAFETY PRECAUTIONS

The instructions below must be followed to prevent product malfunction, property damage, injury or death to the user or other people. Incorrect operation due to ignoring any instructions will cause harm or damage. The level of seriousness is classified by the symbols described below.

## TABLE OF SYMBOLS

 <b>DANGER</b>	<i>This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.</i>
 <b>WARNING</b>	<i>This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</i>
 <b>CAUTION</b>	<i>This symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.</i>
<b>Note</b>	<i>This symbol indicates situations that may result in equipment or property damage accidents only.</i>
	<i>This symbol indicates an action should not be completed.</i>

## Installation

### **WARNING**

All electrical work must be performed by a licensed electrician and conform to local building codes or, in the absence of local codes, with the National Electrical Code, and the instructions given in this manual.

*If the power source capacity is inadequate or the electric work is not performed properly, it may result in fire, electric shock, physical injury or death.*

 Do not touch the communications and EEV kits' wiring, terminals, or other electrical components with tools or exposed skin when the power is connected. Only qualified technicians should install, remove, or re-install the kits. *Improper installation or use may result in fire, electric shock, physical injury or death.*

 Do not install, remove, or re-install the communications and EEV kits by yourself (end user). Ask the dealer or a qualified technician familiar with safety procedures and equipped with the proper tools and test instruments to install the kits. *Improper installation by the user may result in fire, electric shock, physical injury or death.*

For replacement of an installed communications and EEV kits, always contact a qualified LG service provider familiar with safety procedures and equipped with the proper tools and test instruments.

*There is risk of fire, electric shock, and physical injury or death.*

### **Note**

Only qualified technicians familiar with safety procedures and equipped with the proper tools and test instruments should install, remove, or re-install the communications and EEV kits.

*Improper installation or use may result in product malfunction.*

 Do not install the communications and EEV kits in a location where the kits can be exposed to rain, snow, etc. *There is risk of product malfunction.*

 Do not install the communications and EEV kits in a location where the kits can be exposed to rain, snow, etc. *There is risk of physical injury or death due to electric shock.*

### **Safely dispose of the packing materials.**

*Tear apart and throw away plastic packaging bags so that children may not play with them and risk suffocation and death.*

**Wear protective gloves when unpacking, installing, and handling the kits. Sharp edges may cause personal injury.**

 Do not install the communications and EEV kits in locations where either kit could fall down. *There is risk of physical injury.*

### **Use the appropriate parts and connectors.**

*There is risk of physical injury or death due to fire and / or electric shock.*

**Replace all control box and panel covers on the communications and EEV kits.**

*If cover panels are not installed securely, dust, water, and animals may enter the kits, causing fire, electric shock, and physical injury or death.*

**Failure to carefully read and follow all instructions in this manual can result in physical injury or death.**

 Do not drop the communications and EEV kits. *It may damage the products.*

**Failure to carefully read and follow all instructions in this manual can result in property damage and equipment malfunction.**

# SAFETY PRECAUTIONS

## WIRING

### **⚠ DANGER**

**High voltage electricity is required to operate the communications and EEV kits. Adhere to the NEC code and these instructions when wiring.**

*Improper connections and inadequate grounding can cause accidental injury or death.*

**Always ground the communications and EEV kits following local, state, and NEC codes.**

*There is risk of fire, electric shock, and physical injury or death.*

**Turn the power off at the nearest disconnect before servicing the equipment.**

*Electrical shock can cause physical injury or death.*

**Properly size all circuit breakers or fuses.**

*There is risk of fire, electric shock, explosion, physical injury or death.*

**Communication kit requires its own power source (EEV kit is powered off of Communication kit). Ⓞ Do not share the power source with other equipment.**

*There is risk of heat generation which may cause fire, electric shock, explosion, physical injury or death.*

### **⚠ WARNING**

**The information contained in this manual is intended for use by a trained electrician familiar with the U.S. National Electric Code (NEC) who is equipped with the proper tools and test instruments.**

*Failure to carefully read and follow all instructions in this manual can result in personal injury or death.*

**All electric work must be performed by a licensed electrician and conform to local building codes or, in the absence of local codes, with the National Electrical Code, and the instructions given in this manual.**

*If the power source capacity is inadequate or the electric work is not performed properly, it may result in fire, electric shock, physical injury or death.*

**Use power wires of sufficient current capacity and rating. Refer to local, state, and national codes.**

*Wires that are too small may generate heat and cause a fire resulting in physical injury or death.*

**Secure all field wiring connections with appropriate wire strain relief.**

*Improperly securing wires will create undue stress on equipment power lugs. Inadequate connections may generate heat, cause a fire and result in physical injury or death.*

**Verify that all power wiring, plugs, and sockets are not loose or damaged.**

*Loose wiring may overheat at connection points causing a fire or electrical shock and result in physical injury or death.*

### **Note**

Ⓞ **Do not supply power to the communication and EEV kits until all electrical wiring, controls wiring, piping, installation, and refrigerant evacuation are completed for the entire air conditioning system.**

**The information contained in this manual is intended for use by a trained, licensed electrician familiar with the U.S. National Electric Code (NEC) and equipped with the proper tools and test instruments.**

*Failure to carefully read and follow all instructions in this manual can result in equipment malfunction and property damage.*

# SAFETY PRECAUTIONS

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## OPERATION

### DANGER

 Do not provide power to or operate communication and EEV kits if the kits are flooded or submerged. Always have the dealer or an authorized technician to service the kits.  
*There is risk of fire, electric shock, physical injury or death.*

**Unplug the communication and EEV kits if either kit emits strange sounds, smells, or smoke.**  
*There is risk of fire, electric shock, physical injury or death.*

 Do not store or use flammable gas or combustibles near the communications and EEV kits.  
*There is risk of fire, explosion, and physical injury or death.*

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### WARNING

 Do not install the communications and EEV kits in locations exposed to open flame or extreme heat. Do not touch the kits with wet hands.  
*There is risk of fire, electric shock, physical injury or death.*

 Do not step or place anything on the communications and EEV kits.  
*If the product falls, there is risk of physical injury.*

 Do not modify or extend the power supply cords.  
*There is risk of fire, electric shock, physical injury or death.*

 Do not place heavy objects on the communications and EEV kits' power cables.  
*There is risk of fire, electric shock, physical injury or death.*

---

### CAUTION

Only authorized persons should operate the communications and EEV kits.  
*If the kits are not operated properly, there is a risk of physical injury.*

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### Note

 Do not let the communication and EEV kits get wet.  
*There is risk of product failure or malfunction.*

 Do not drop the communications and EEV kits.  
*There is risk of product failure or malfunction.*

Only authorized persons should operate the communication and EEV kits.  
*There is risk of product failure or malfunction.*

 Do not step or place anything on the communications and EEV kits.  
*If the product falls, there is risk of product damage.*

# AHU KIT INTRODUCTION

## Introduction

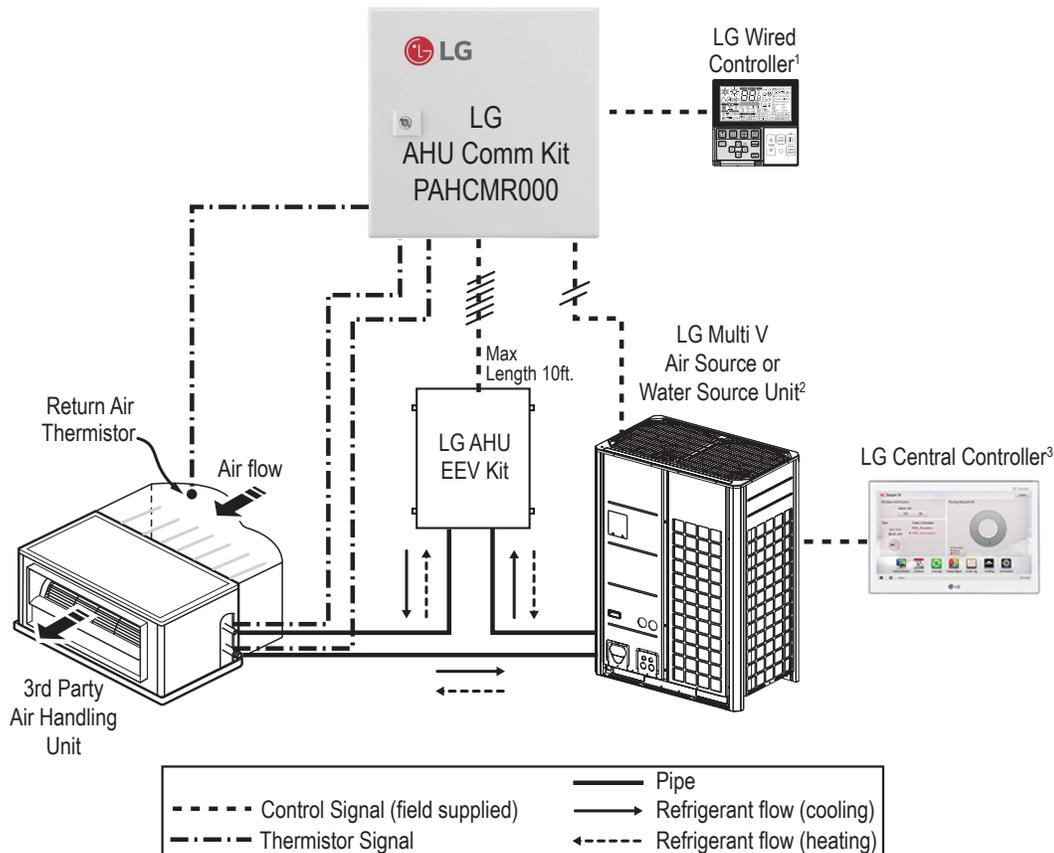
The PAHCMR000 AHU Communications Kit bridges LG's air conditioning outdoor unit to a third party Air Handling Unit (AHU). Its function is based on the return air temperature control. In installations where the AHU is designed with Direct Expansion (DX) Coil, the PAHCMR000 will control the return air temperature by measuring the inlet and outlet temperatures of the DX coil and changing the operation of the outdoor unit and the expansion unit. PAHCMR000 AHU Communications Kit features are:

- It can be used with LG Multi V air or water source outdoor units and LG Single Zone outdoor units.
- It supports AHU coil capacities from 12 - 396 kBtu/h.
- It controls the Electronic Expansion Valve (EEV, required, sold separately)
- It measures the return air temperature through the enclosed temperature sensor and controls the outdoor unit to secure the demanded return air temperature.
- It can be directly connected to direct digital control (DDC) without a separate control module, so DDC can receive product control and status information through Modbus communication.
- The PAHCMR000 AHU Communications Kit consists of a chassis, communication module, pipe-in thermistor, pipe-out thermistor, and room (return) air thermistor.

Figure 1: PAHCMR000 AHU Communications Kit.



Figure 2: AHU Communications Kit System Schematic.



<sup>1</sup>LG wired controller is required.

<sup>2</sup>Compatible units are Multi V and Single Zone.

<sup>3</sup>Compatible central controllers are AC EZ, AC Smart IV, and ACP IV.

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# AHU COMMUNICATIONS KIT SPECIFICATIONS, COMPONENTS LIST

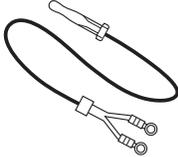
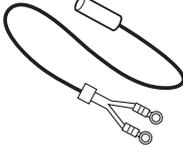
## Specifications

Table 1: PAHCMR000 AHU Communications Kit Specifications Table.

<b>Kit Model Number</b>	PAHCMR000
<b>For Use With</b>	Multi V and Single Zone systems
<b>Power Supply Requirements</b>	208-230VAC, 60Hz, 1Ph
<b>Rated Current</b>	0.1A
<b>Ambient Operating Temperature Range</b>	-4 to +149°F
<b>Ambient Operating Humidity Range</b>	0 to 98% (Non-condensing)
<b>Dimensions (in., W x H x D)</b>	11-13/16 x 6-3/32 x 11-13/16
<b>Net Weight (lbs.)</b>	13.7
<b>Shipping Weight (lbs.)</b>	16.4
<b>Communications</b>	RS-485 (Connects to Indoor Unit A / B Terminals on Air-Source / Water-Source Unit PCB; Master unit in multi-frame systems)
<b>Communications Cable</b>	AWG 18 x 2 Stranded, Shielded Copper Wire

## AHU Communications Kit Components

Table 2: PAHCMR000 AHU Communications Kit Components Table (factory supplied).

Part	Quantity	Image
AHU Communications Kit	One (1)	
Return Air (Room) Thermistor	One (1)	
Pipe Thermistor	Two (2) (One [1] Pipe In, One [1] Pipe Out)	

# AHU COMMUNICATIONS KIT INSTALLATION

## Selecting the Best Location

### AHU Communications Kit Design Parameters

- Minimum coil entering air temperature is 41°F when system is operating in heating mode.
- AHU coil sizing parameters:
  - Suction (evaporating) temperature for coil sizing is 41°F, Condensing (liquid) temperature for coil sizing is 110°F.
  - Recommended coil tube sizes: 3/8 or 1/2 inches.
  - Coil volume is needed to calculate additional refrigerant charge amount.
  - Coils larger than 8 tons on heat recovery systems or 32 tons on heat pump systems should be divided into multiple circuits to allow EEV Kit connection (EEV Kit sold separately).
- Pipe sizing rules are same rules as the connected air-source or water-source unit (see respective Engineering and Installation Manuals for more information).
- Maximum recommended combination ratio is 100%.
- AHU Communications Kits and EEV Kits (sold separately) are not weatherproof and must be protected from rain, snow, etc.

### Selecting the Best Location

#### Do

- Install the AHU Communications and EEV Kits with the access panels facing outward.
- Install in a location that can support the weight of the kits.
- Install the EEV kit on the AHU as close as possible to the heat exchanger.

#### Don't

- Don't install or operate the unit in an area where mineral oils, sulphuric gases, acidic or alkaline vapors or spray are present.
- Don't install in an area where the air contains high levels of salt (oceanside locations).
- Don't install in vehicles or vessels.
- Don't install in an area where voltage fluctuates significantly (factories), or near machines that generate electromagnetic waves.

### AHU Operation Range

Range of the heat exchanger inlet air temperature is 64.4 to 104°F for cooling, and 41 to 86°F for heating. If the temperature is <64.4°F for cooling and >86°F for heating, the system might cycle on and off because of the system's protection logic.

#### Note

*To measure room temperature accurately, install the room thermistor in the heat exchanger inlet. If the room thermistor is not installed properly, the AHU may not operate properly.*

*When installing Room thermistor, always place it to the inlet of Heat Exchanger. Otherwise, it may not operate properly.*

Table 3: AHU Applications and Conditions.

Application	Conditions
100% fresh air intake: The AHU(s) is (are) the only indoor unit(s) connected to the air-source / water-source unit(s).	The total capacity of 100% Fresh Air Intake AHU(s) should be 50~100% of the air-source / water-source unit(s).
Combination of indoor unit(s) and 100% Fresh air intake AHU(s) is (are) connected to the air-source/water-source unit(s)	-The combination ratio should be 50~100% -The total capacity of the 100% fresh air intake AHU should be less than 30% of the air-source/water-source unit capacity

# AHU COMMUNICATIONS KIT INSTALLATION

## DIP Switch Settings

### Setting the AHU DIP Switches

For the AHU Communications Kit to function properly, set the DIP switches as required by your system.

Figure 3: DIP Switches

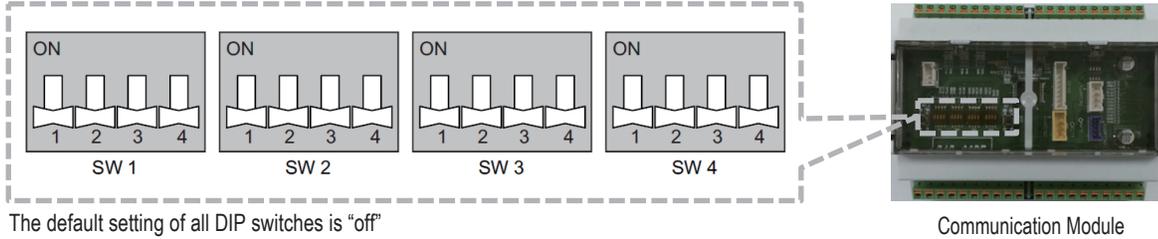


Table 4: DIP Switch Settings.

DIP Switch	Switch Number	Item	Setting		Note
SW1	1	ODU Type	On	Single Comm.	Using Single Zone outdoor unit
			Off	MULTI V Comm.	Using MULTI V outdoor unit
	2	Control Type	On	Communication	Controlled by DDC through Modbus and LG centralized controller
			Off	Contact signal	Controlled by DDC through Contact signal (AI, DI) LG Centralized controller can only monitor status
	3	DO Type	On	Fan speed	DO1 : High, DO2 : Middle, DO3 : Low
			Off	Status	DO1 : On/Off, DO2 : Defrost, DO3 : Alarm
	4	Fan Speed (TH. On/Off)	On	Fixed	Fan Speed doesn't change when TH. On/Off (Cooling/Heating)
			Off	Change	Fan Speed change to LOW when Th. Off in Cooling Mode Fan Speed change to STOP when Th. Off in Heating Mode
SW2	1	Reserved	-	-	-
	2	Reserved	-	-	-
	3/4	UI Setting	Off/Off	UI Setting #1	UI1 : Operation On/Off, UI2 : Heating/Cooling UI3 : Forced Thermo On/Off, UI4 : Target air temperature
			Off/On	UI Setting #2	UI1 : Operation On/Off, UI2 : Cooling only/Off UI3 : Heating only/Off, UI4 : Forced Thermo On and Off
			On/Off	Reserved	-
On/On	Reserved	-			
SW3	1	Master/Slave	On	Slave mode	
			Off	Master mode	Master mode is default for single AHU Controller installation.
	2/3	Operation mode setting	Off/Off	Heat Pump	Cooling or Heating operation mode is available
			Off/On	Heating Only	Operation mode is Heating only (Heating / Fan)
			On/Off	Cooling Only	Operation mode is Cooling only (Cooling / Fan)
On/On			Reserved	-	
4	Reserved	-	-	-	
SW4	1~4	Capacity Setting	--		Refer to the capacity DIP switch setting table for details

Notes :

- 1) Do not change reserved switches. Changing reserved switches may cause equipment malfunction.
- 2) If using group control, the maximum length of the group control cable is 50m.

# AHU COMMUNICATIONS KIT INSTALLATION

## DIP Switch Settings

### Setting the AHU DIP Switches

Set DIP switch SW4 as appropriate for the capacity of your air handling unit.

Table 5: SW4 DIP Switch Settings for AHU Capacity.

Switch Number	SW4 DIP switches	Capacity (kBTU/h)	
		MULTI V	Single Zone
1		12	5
2		15	7
3		18	9
4		24	12
5		28	15
6		36	18
7		42	24
8		48	30
9		54	36
10		76	42
11		96	48
12		115	60
13		134	70
14		153	85
15		172	Reserved
16		192	Reserved

Notes:

1. PAHCMR000 AHU can be connected to the PRLK048A0, PRLK096A0, or PRLK396A0 EEV kits only.
2. If connecting the PRLK396A0 EEV kit to a Multi V outdoor unit, set DIP switches 1, 2, 3, and 4 to ON to set capacity to 192 kBTU/h.

# AHU COMMUNICATIONS KIT INSTALLATION

## AHU Communications Kit Parts

Figure 4: AHU Communications Kit Parts Diagram.

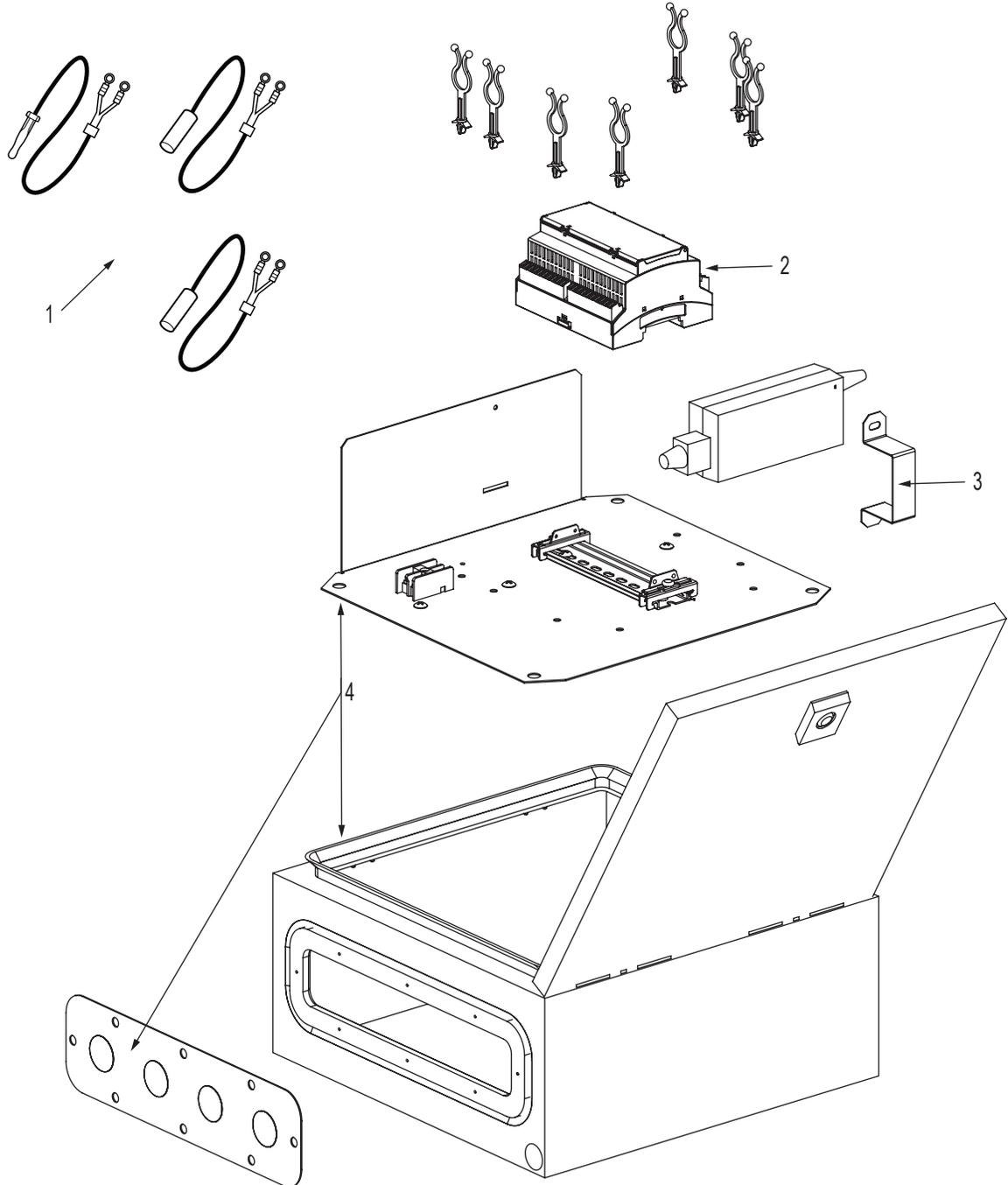


Table 6: AHU Communications Kit Parts Table.

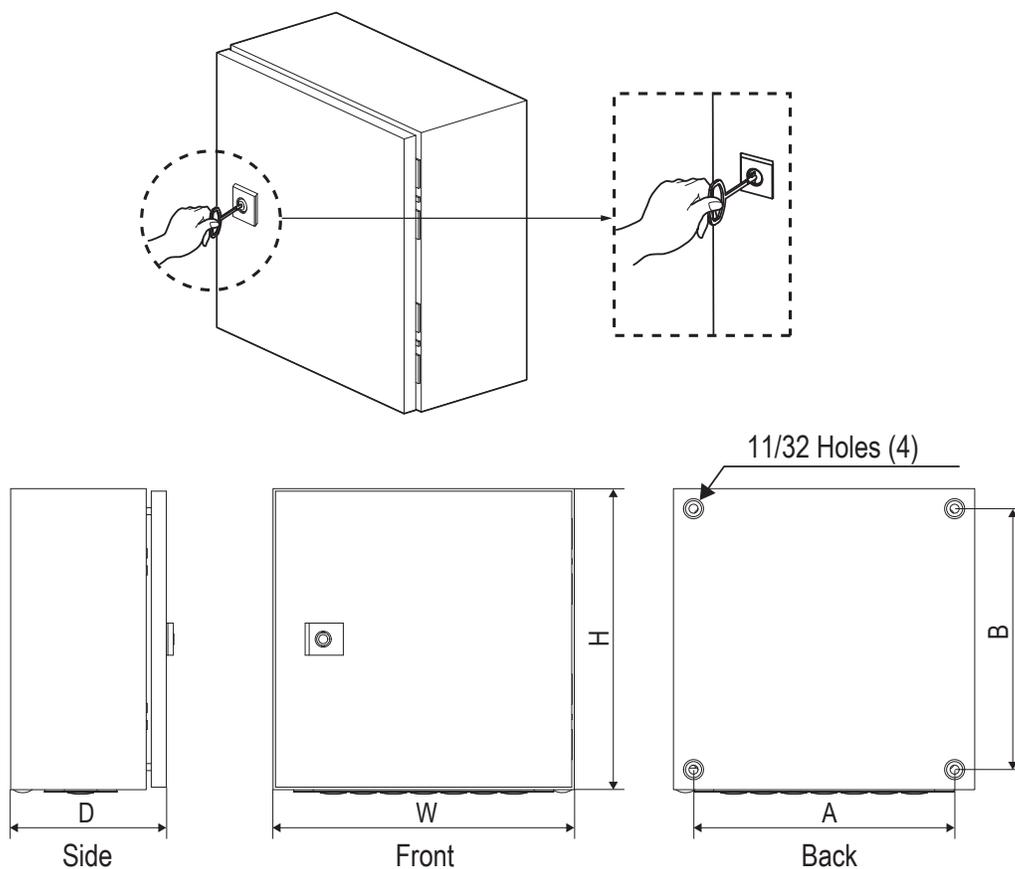
Diagram Label	Part Name	Quantity
1	Thermistor Assembly,NTC	Three (3)
2	Controller Assembly	One (1)
3	Bracket	One (1)
4	Panel Assembly,Control	Three (3)

# AHU COMMUNICATIONS KIT INSTALLATION

## AHU Communications Kit Mounting

1. Use the key to open the AHU Communication Kit door.
2. Use the AHU Communication Kit as a template and mark the locations of the screw holes. Drill the four (4) 11/32 inch holes.
3. Securely attach the AHU Communication Kit using four (4) field-supplied screws.

Figure 5: AHU Communications Kit Installation

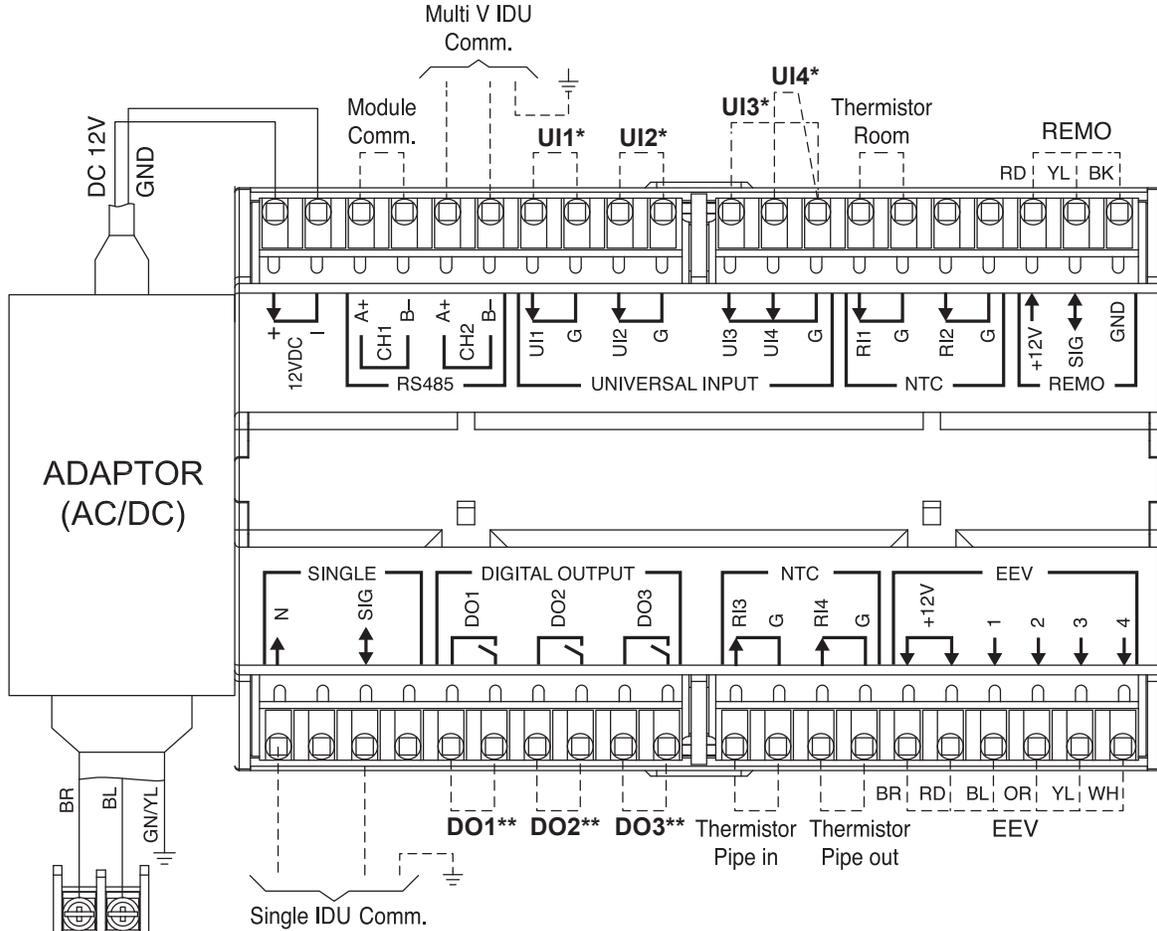


Model	Size (inch)				
	W	D	H	A	B
PAHCMR000	11-4/5	6-1/9	11-4/5	10-1/4	10-1/4

# AHU COMMUNICATIONS KIT INSTALLATION

## Wiring Diagram

Figure 6: PAHCMR000 AHU Communications Kit Wiring Diagram.



POWER SUPPLY  
220-240 V~ 50/60 Hz  
208/230 V~ 60 Hz

— FACTORY WIRING  
- - - FIELD WIRING

BR : BROWN  
RD : RED  
BL : BLUE  
OR : ORANGE  
YL : YELLOW  
WH : WHITE  
BK : BLACK

\* Set the UI1, UI2, UI3, and UI4 ports DIP switches as appropriate for your system

SW2 3/4	UI Setting	Off/Off	UI Setting #1	UI1 : Operation On/Off UI2 : Heating/Cooling UI3 : Forced Thermo On/Off UI4 : Target air temperature
		Off/On	UI Setting #2	UI1 : Operation On/Off UI2 : Cooling only/Off UI3 : Heating only/Off UI4 : Forced Thermo On and Off

\*\* Set the DO1, DO2, and DO3 ports DIP switches as appropriate for your system

SW1 3	DO Type	On	Fan speed	DO1 : High DO2 : Middle DO3 : Low
		Off	Status	DO1 : On/Off DO2 : Defrost DO3 : Alarm

# AHU COMMUNICATIONS KIT INSTALLATION

## Wiring Diagram

Table 7: RS485/Single Communications Port.

Name	Port	Contents	Electrical Spec.	Function
Module Comm.	RS485 CH1	DDC(Modbus) Comm.	Max 1640 ft (500 m), 2C x 18~16 AWG (shield wire)	Communication with DDC or Main module of PAHCMS000 model through Modbus protocol
MULTI V IDU Comm.	RS485 CH2	MULTI V IDU Comm.	Max 3280 ft (1 km), 2C x 18~16 AWG (shield wire)	Communication with MULTI V Outdoor unit
Single IDU Comm.	SINGLE N/SIG	Single IDU Comm.	Max 246 ft (75 m), 2C x 18~16 AWG (shield wire)	Communication with Single Split Outdoor unit

Table 8: NTC Thermistors.

Name	Port	Contents	Electrical Spec.	Function
Thermistor Room	NTC RI1/G	Room(Return)airthermistor	NTC 10kΩ, 16.4ft	Return air temperature sensor
Thermistor Pipe in	NTC RI3/G	Pipe in(Liquid)thermistor	NTC 5kΩ, 16.4ft	Inlet pipe (Liquid) Temp. sensor
Thermistor Pipe out	NTC RI4/G	Pipe out (Gas) thermistor	NTC 5kΩ, 16.4ft	Outlet pipe (Gas) Temp. sensor

# AHU COMMUNICATIONS KIT INSTALLATION

## Power Wiring

### General Power Wiring Guidelines

#### ⚠ WARNING

All electrical work must be performed by a licensed electrician and conform to local building codes or, in the absence of local codes, with the National Electrical Code, and the instructions in this manual.

*Inadequate power source capacity or improper electric work may result in fire, electric shock, physical injury or death.*

All field-supplied parts, materials, and electric work must be conform to local codes.

*Improper components and installation may result in fire, electric shock, physical injury or death.*

A main switch or disconnect, in accordance with relevant local and national codes, and having a contact separation in all poles, must be incorporated in the wiring.

*Improper installation by the user may result in fire, electric shock, physical injury or death.*

Refer to the air-source / water-source heat pump unit installation manual for power wiring sizes, circuit breaker and switch capacities, and wiring instructions.

*If the power source capacity for the air-source unit / water-source unit is inadequate or the electric work is not performed properly, it may result in fire, electric shock, physical injury or death.*

Use copper wire only and connect wires tightly to the terminals. Install wiring so that other equipment is not obstructed.

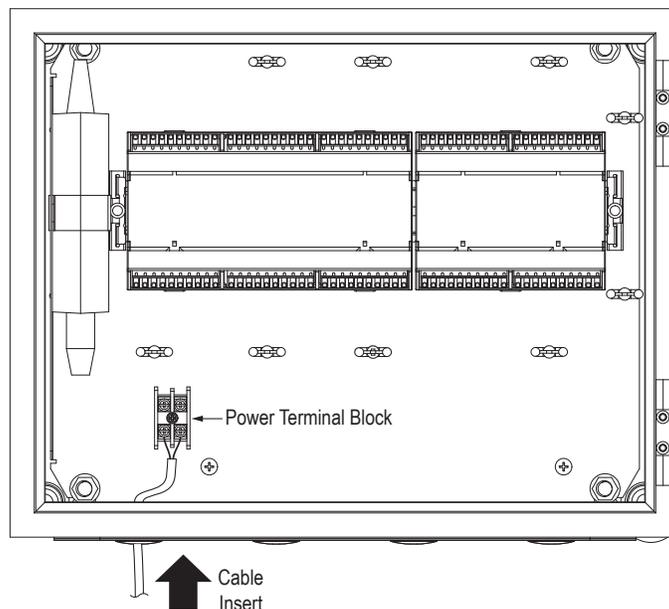
*Improper or incomplete connections could result in overheating, fire, electric shock, physical injury or death.*

Ensure the power source is disconnected before performing this procedure.

*If the power source is connected during this procedure, it could result in electric shock, physical injury, or death.*

1. Carefully pull the power cable through the cable nut and grommet.
2. Connect the power cable to the power terminal block.
3. Pull enough cable through the nut and grommet to allow enough slack for strain relief.
4. Tighten the cable nut.

Figure 7: Power Wiring Connection.  
(Front View)



# AHU COMMUNICATIONS KIT INSTALLATION

## Communications Wiring

### ⚠ WARNING

All electrical work must be performed by a licensed electrician and conform to local building codes or, in the absence of local codes, with the National Electrical Code, and the instructions in this manual.

*If the electrical work is not performed properly, it may result in fire, electric shock, physical injury or death.*

All field-supplied parts, materials, and electric work must be conform to local codes.

*Improper components and installation may result in fire, electric shock, physical injury or death.*

Ensure the power source is disconnected before performing this procedure.

*If the power source is connected during this procedure, it could result in electric shock, physical injury, or death.*

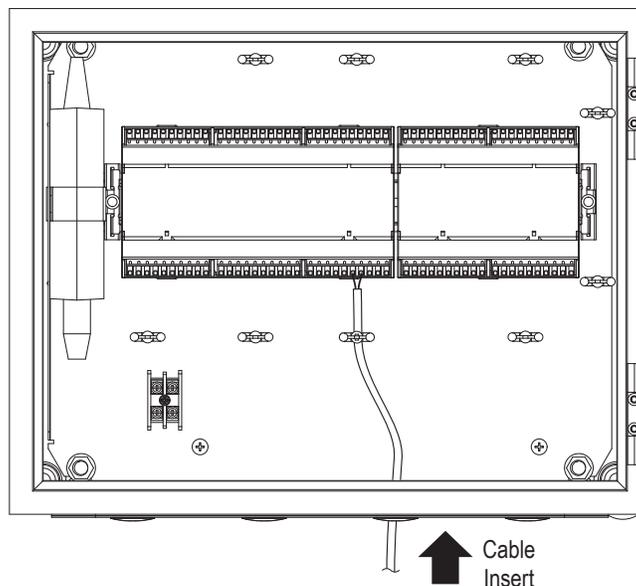
### Note

• Communications wiring must be 18 gauge, shielded, and stranded.

• The thermistor cable, remote controller wires, and communications wires should be positioned at least two (2) inches away from power supply wires. If these wires are installed too close together, it may result in product malfunction due to electrical interference.

1. Carefully pull the communications cable through the cable nut and grommet.
2. Refer to the wiring diagram in Figure 6 and connect the communications cable to the power terminal block.
3. Pull enough cable through the nut and grommet to allow enough slack for strain relief.
4. Tighten the cable nut.

Figure 8: Communications Wiring Connection  
(Front View)



# AHU COMMUNICATIONS KIT INSTALLATION

## Connection for Fan Signal

### AHU Communications Kit to Air Handler Unit Connection (Fan Motor Control)

#### ⚠ WARNING

AHU Communications Kit Hi/Med/Low wires should not be connected directly to the AHU fan motor. Improper connections could result in fire, electric shock, physical injury or death.

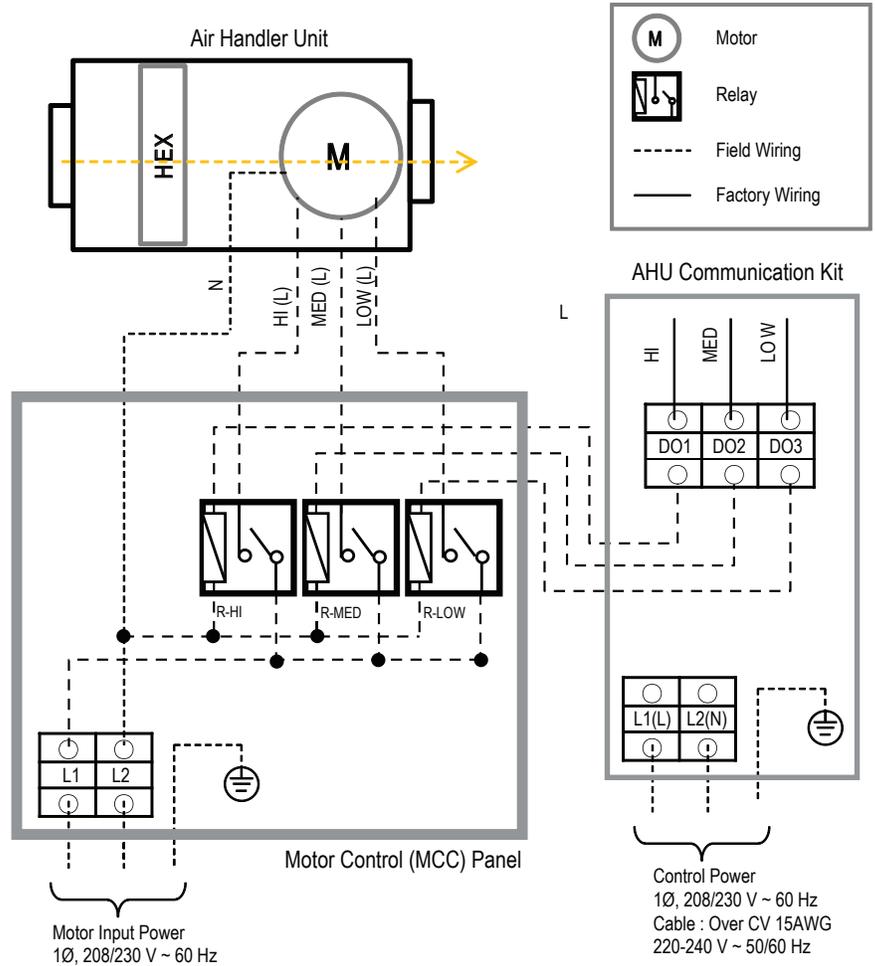
- AHU manufacturer-supplied relays must be used to connect the LG AHU Communications Kit to the AHU fan motor.

- MCC panel means motor control panel.

#### Note

- AHU Communications Kit Hi/Med/Low wires should not be connected directly to the AHU fan motor. Improper connections could result in product damage.
- If the third-party AHU fan motor is the On/Off type, the HI/MED/LOW wires from the motor control panel to the AHU have to connect as one common wire. Example: If just the Hi wire is connected, the fan motor will not operate using the LG AHU Communications Kit control logic.

Figure 9: AHU Communications Kit to AHU Connection (For Fan Signal).



# AHU COMMUNICATIONS KIT INSTALLATION

## Thermistor Installation

### Thermistor Locations

All thermistors (one [1] return air [room] thermistor and two [2] pipe thermistor) must be correctly installed to ensure proper AHU Communications Kit operation.

1. Return Air (Room) Thermistor: Install it at the AHU heat exchanger inlet in the return air stream.
2. Pipe In Thermistor: Install it behind the distributor on the coldest area in the heat exchanger (contact the heat exchanger manufacturer for the precise location).
3. Pipe Out Thermistor: Install it at the outlet of the heat exchanger as close as possible to the heat exchanger.

#### Note

System operation must be evaluated to determine if the AHU evaporator is protected against freezing up. Run a system test, and see if the AHU evaporator is freezing up.

Figure 10: Location of the Return Air (Room) Thermistor.

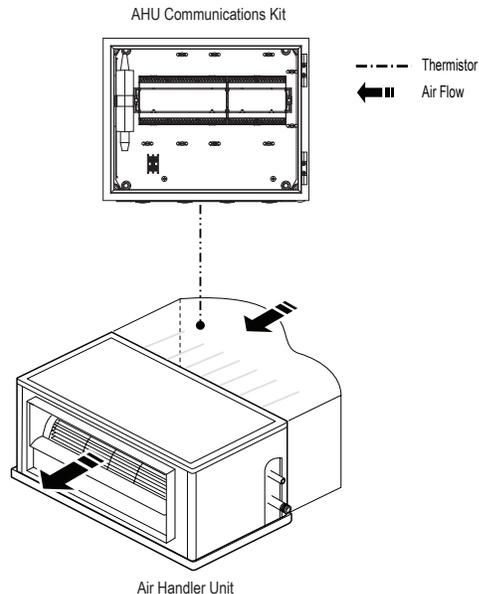
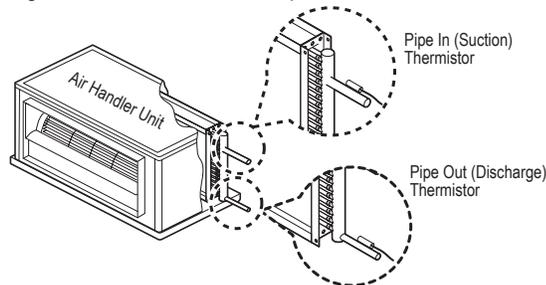


Figure 11: Locations of the Pipe Thermistors.



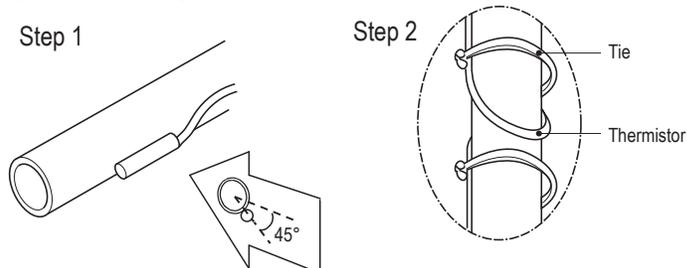
### Thermistor Cable Installation

- Place the thermistor cables in a separate protective tube.
- Always add a pull-relief to the thermistor cable to avoid strain on the thermistor cable and loosening of the thermistor.

#### Note

Strain on the thermistor cable or loosening of the thermistor may result in a bad contact and incorrect temperature measurements. Thermistors must be securely attached for proper operation.

Figure 12: Securing the Thermistor Cable.



# AHU COMMUNICATIONS KIT INSTALLATION

## Thermistor Installation

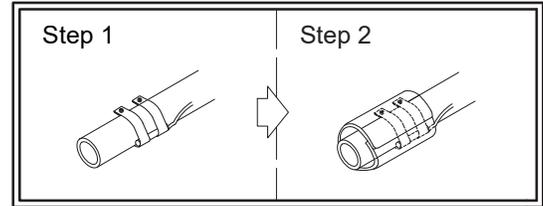
### Attaching the Pipe Thermistors

**Note:**

Thermistors must be securely attached with a pipe strap. The equipment will not operate properly if thermistors are not making good physical contact in the appropriate installation location.

1. Securely attach the thermistor to the pipe with a field-supplied pipe strap.
2. Insulate the thermistor with a field-supplied insulation sheet that is >5t.

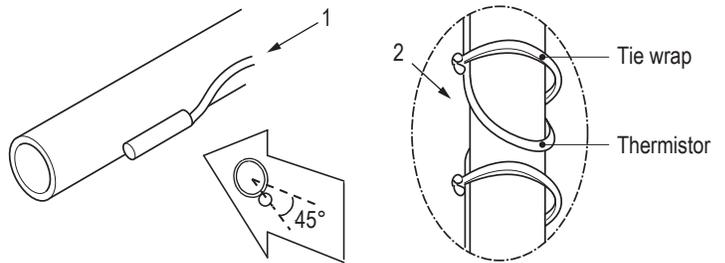
Figure 13: Attach Pipe Thermistors.



### Tips for Attaching the Pipe In / Pipe Out Thermistors

- Put the thermistor cable in a separate protective tube.
- Always add a pull-relief to the thermistor cable to avoid strain on the thermistor cable and loosening of the thermistor. Strain on the thermistor cable or loosening of the thermistor can result in bad contact with the pipe and incorrect temperature measurement.

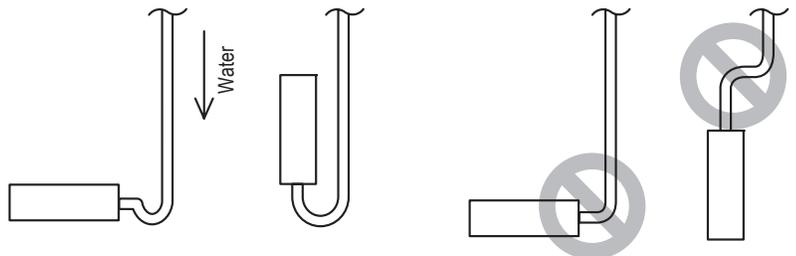
Figure 14: Thermistor and Cable Installation.



- To avoid water accumulating on the thermistor tip, position the thermistor cable slightly below the thermistor tip, or install the thermistor tip parallel with the cable.

⊘ Do not include a 90° angle or a kink in the thermistor cable, nor install the thermistor tip upside down.

Figure 15: Positioning the Thermistor Cable and Tip.

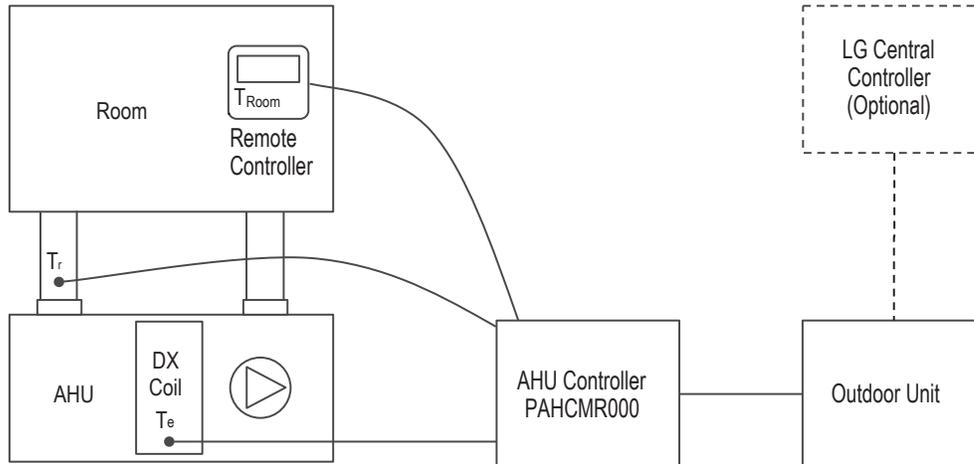


# AHU COMMUNICATIONS KIT INSTALLATION

## Solutions Overview

### Return Air Temperature Control

LG Control : Fixed  $T_e + T_r$  or  $T_{Room}$



A fixed evaporating or condensing temperature of a DX coil ( $T_e$ ) can be controlled by either return air temperature ( $T_r$ ) or room air temperature ( $T_{Room}$ ). A fixed target evaporating or condensing temperature can be changed in MULTI V and Single outdoor unit setting.

#### Required Items

	Expansion Valve	Wired Remote Controller	Central Controller
MULTI V	EEV	0	Optional
Single Split	Not Required	0	Optional

#### Function List

	Function List	LG Remote Controller	LG Central Controller
Control	Operating On/Off	0	0
	Operation Mode	0	0
	Return Air Temperature	0	0
	Discharge Air Temperature	X	X
	Forced Thermal On/Off	X	X
	Capacity Control	X	X
	Emergency Stop	X	0
Monitor	Operating On/Off	0	0
	Operation Mode	0	0
	Return Air Temperature	0	0
	Discharge Air Temperature	X	X
	Defrost status	0	X
	Error Alarm	0	0
	Compressor On/Off	0	X

Notes :

0 = Applied, X = Not applied

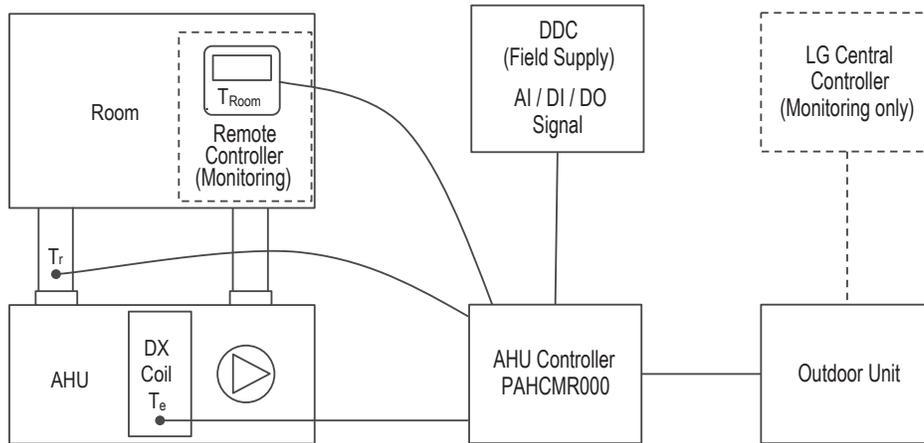
1. LG Central controller is based on AC Smart IV and ACP IV
2. Refer to Universal Input – UI Setting #1 for more detail

# AHU COMMUNICATIONS KIT INSTALLATION

## Solutions Overview

### Return Air Temperature Control

DDC Control by Contact Signal : Fixed  $T_e + T_r$  or  $T_{Room}$



1) Note : When DDC control AHU Controller by contact signal, the control command of LG central controller will be disregarded.

The DDC controls return air temperature ( $T_r$ ) or room air temperature ( $T_{Room}$ ) by transferring AI / DI / DO signal to the AHU Communication Kit for Return air control. A fixed target evaporator or condensing temperature ( $T_e$ ) can be changed in MULTI V and Single outdoor setting. LG wired remote controller and LG Central Controller can be optionally applied, but only monitoring function is possible.

### Required Items

	Expansion Valve	Wired Remote Controller	Central Controller
MULTI V	EEV	Optional (Monitoring only)	Optional (Monitoring only)
Single Zone	Not Required	Optional (Monitoring only)	Optional (Monitoring only)

### Function List

	Function List	Contact Signal type (DDC)	LG Remote Controller	LG Central Controller <sup>1</sup>
Control	Operating On/Off	O	X	X
	Operation Mode	O	X	X
	Return Air Temperature	O	X	X
	Discharge Air Temperature	X	X	X
	Forced Thermal On/Off	O	X	X
	Capacity Control	X	X	X
	Emergency Stop	X	X	X
Monitor	Operating On/Off	O	O	O
	Operation Mode	X	O	O
	Return Air Temperature	X	O	O
	Discharge Air Temperature	X	X	X
	Defrost status	O	O	X
	Error Alarm	O	O	O
	Compressor On/Off	X	O	X

Note :

O : Applied, X : Not applied

1. LG Central controller is based on AC Smart IV and ACP IV

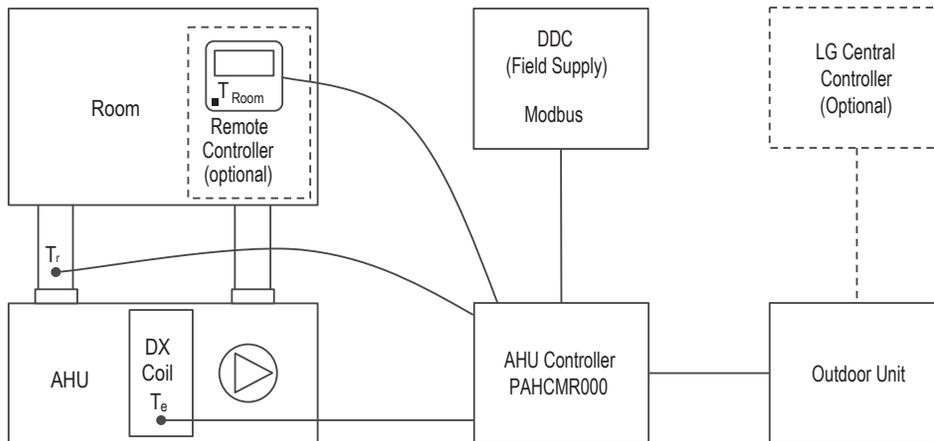
2. Refer to Universal Input – UI Setting #1 for more detail

# AHU COMMUNICATIONS KIT INSTALLATION

## Solutions Overview

### Return Air Temperature Control

DDC Control by Modbus : Fixed  $T_e$  +  $T_r$  or  $T_{Room}$



The DDC controls return air temperature ( $T_r$ ) or room air temperature ( $T_{Room}$ ) by transferring Modbus signal to the AHU Communication Kit for Return air control. To control room air, the LG wired controller can be purchased optionally. A fixed target evaporator or condensing temperature ( $T_e$ ) can be changed in MULTI V and Single Zone outdoor setting.

### Required Items

	Expansion Valve	Wired Remote Controller	Central Controller
MULTI V	EEV	Optional	Optional
Single Split	Not Required	Optional	Optional

### Function List

	Function List	Modbus Comm. type (DDC)	LG Remote Controller	LG Central Controller <sup>1</sup>
Control	Operating On/Off	O	O	O
	Operation Mode	O	O	O
	Return Air Temperature	O	O	O
	Discharge Air Temperature	X	X	X
	Forced Thermal On/Off	X	X	X
	Capacity Control	X	X	X
	Emergency Stop	X	X	O
Monitor	Operating On/Off	O	O	O
	Operation Mode	O	O	O
	Return Air Temperature	O	O	O
	Discharge Air Temperature	X	X	X
	Defrost status	O	O	X
	Error Alarm	O	O	O
	Compressor On/Off	O	O	X

#### Notes

O = Applied; X = Not applied

1. LG Central controller is based on AC Smart IV and ACP IV



# AHU COMMUNICATIONS KIT INSTALLATION

## Solutions Overview

### Universal Input Settings

#### UI Setting #1

UI setting #1 is available when DIP SW 1-2 are OFF and both DIP SW 2-3 and SW 2-4 are OFF.



Note : Dip SW 1-2 is for contact signal control

Name	Port	Value		Electrical Spec.	Function									
		Short	Open											
On / Off	UI1 (DI)	On	Off	Non voltage	Operation On/Off Control									
Cool / Heat	UI2 (DI)	Heating	Cooling	Non voltage	Heating/Cooling Operation Control if operation mode (DIP SW 3-2, 3-3) is set to cooling only mode, UI2 "Short" status will work as fan mode. if operation mode (DIP SW 3-2, 3-3) is set to heating only mode, UI2 "Open" status will work as fan mode.									
Forced Thermo On / Off	UI3 (DI)	Thermal On	Thermal Off	Non voltage	When UI4(Target temp.) is less than 1.5 V, Target temp. and Room temp. is fixed like below table <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Mode \ UI3 status</th> <th>Cooling Mode (°F)</th> <th>Heating Mode (°F)</th> </tr> </thead> <tbody> <tr> <td>Thermal On</td> <td>Target temp. = 60 Room temp. = 80</td> <td>Target temp. = 80 Room temp. = 60</td> </tr> <tr> <td>Thermal Off</td> <td>Target temp. = 80 Room temp. = 60</td> <td>Target temp. = 60 Room temp. = 80</td> </tr> </tbody> </table>	Mode \ UI3 status	Cooling Mode (°F)	Heating Mode (°F)	Thermal On	Target temp. = 60 Room temp. = 80	Target temp. = 80 Room temp. = 60	Thermal Off	Target temp. = 80 Room temp. = 60	Target temp. = 60 Room temp. = 80
Mode \ UI3 status	Cooling Mode (°F)	Heating Mode (°F)												
Thermal On	Target temp. = 60 Room temp. = 80	Target temp. = 80 Room temp. = 60												
Thermal Off	Target temp. = 80 Room temp. = 60	Target temp. = 60 Room temp. = 80												
Target Temp.	UI4 (AI)	Voltage		DC 0~10 V, 20 mA	Cooling Mode (°F)	Heating Mode (°F)								
		V	Min.		Max	UI3 short : 60 UI3 open : 80	UI3 short : 80 UI3 open : 60							
		< 1.5	0		1.6	60	60							
		2.0	1.9		2.1	62	62							
		2.5	2.4		2.6	64	64							
		3.0	2.9		3.1	66	66							
		3.5	3.4		3.6	68	68							
		4.0	3.9		4.1	69	69							
		4.5	4.4		4.6	71	71							
		5.0	4.9		5.1	73	73							
		5.5	5.4		5.6	75	75							
		6.0	5.9		6.1	77	77							
		6.5	6.4		6.6	78	78							
		7.0	6.9		7.1	80	80							
		7.5	7.4		7.6	82	82							
8.0	7.9	8.1	84	84										
8.5	8.4	8.6	86	86										
9.0 ≤	8.7	10.0												

Note : Maintain previous value when getting intermediate value to UI4

# AHU COMMUNICATIONS KIT INSTALLATION

## Solutions Overview

### Universal Input Settings

#### UI Setting #2

'UI setting #2' is available when Dip SW1-2 is OFF, Dip SW 2-3 is OFF and SW 2-4 is ON.



Note : Dip SW 1-2 is for contact signal control

Name	Port	Value		Electrical Spec.	Function									
		Short	Open											
On / Off	UI1 (DI)	On	Off	Non voltage	On/Off operation control									
Forced Th. On / Off	UI4 (DI)	Thermal On	Thermal Off	Non voltage	<table border="1"> <thead> <tr> <th>Mode \ UI3 status</th> <th>Cooling Mode (°F)</th> <th>Heating Mode (°F)</th> </tr> </thead> <tbody> <tr> <td>Thermal On</td> <td>Target temp. = 60 Room temp. = 80</td> <td>Target temp. = 80 Room temp. = 60</td> </tr> <tr> <td>Thermal Off</td> <td>Target temp. = 80 Room temp. = 60</td> <td>Target temp. = 60 Room temp. = 80</td> </tr> </tbody> </table>	Mode \ UI3 status	Cooling Mode (°F)	Heating Mode (°F)	Thermal On	Target temp. = 60 Room temp. = 80	Target temp. = 80 Room temp. = 60	Thermal Off	Target temp. = 80 Room temp. = 60	Target temp. = 60 Room temp. = 80
					Mode \ UI3 status	Cooling Mode (°F)	Heating Mode (°F)							
					Thermal On	Target temp. = 60 Room temp. = 80	Target temp. = 80 Room temp. = 60							
Thermal Off	Target temp. = 80 Room temp. = 60	Target temp. = 60 Room temp. = 80												

### Operation Mode Setting

Mode	Status		Electrical Spec.	Function
	UI2	UI3		
Cooling	Short	Open	Non voltage	Cooling mode operation control
Heating	Open	Short	Non voltage	Heating mode operation control
Fan	Open	Open	Non voltage	Fan mode operation control
	Short	Short	Non voltage	

# AHU COMMUNICATIONS KIT INSTALLATION

## Solutions Overview

### Universal Input Settings

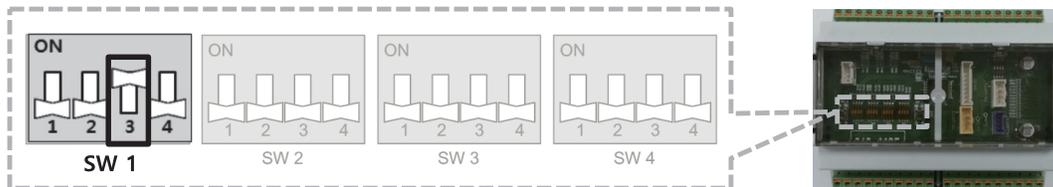
#### UI Setting #2 - continued

'Status Output' is available when Dip SW1-3 is OFF



Name	Port	Value		Electrical Spec.	Function
		Short	Open		
On / Off	DO1	On	Off	12 VDC / 1A, 250VAC / 3A	Operation On/Off Status
Defrost	DO2	Defrost	Normal		ODU Defrost Status(Only total defrost mode)
Alarm	DO3	Error	Normal		Error output status

'Fan Speed Output' is available when Dip SW1-3 is ON



Name	Port	Value		Electrical Spec.	Function
		Short	Open		
Fan_High	DO1	High	-	12 VDC / 1A, 250VAC / 3A	Fan High
Fan_Mid	DO2	Mid	-		Fan_Mid
Fan_Low	DO3	Low	-		Fan_Low
Fan_Stop	DO1 DO2 DO3	-	Stop		Fan_Stop (When all DO are 'Open' Status)

# AHU COMMUNICATIONS KIT INSTALLATION

## Solutions Overview

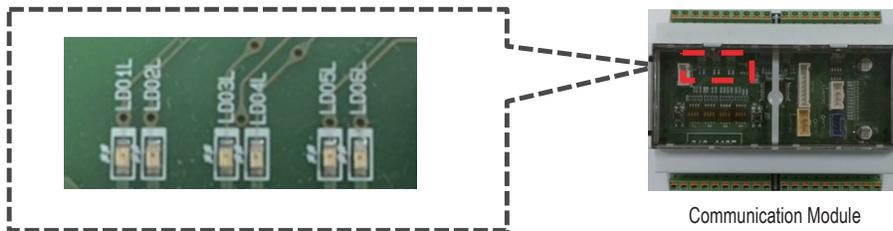
### Remote Controller

Name	Port	Item	Electrical Spec.	Function
REMO	+12V/SIG/GND	Wire Remote Controller	Max 164 ft	Communication with Wired Remote Controller

### Electronic Expansion Valve

Name	Port	Item	Electrical Spec.	Function
EEV	12 VDC/1/2/3/4	EEV Control	Max 32.8 ft	EEV Control

### LED Display



Communication Module

Name	Port	Function
LD01L	LED1	Modbus Comm. Tx
LD02L	LED2	Modbus Comm. Rx
LD03L	LED3	Inner Comm. Tx
LD04L	LED4	Inner Comm. Rx
LD05L	LED5	ODU Comm. (Repeat On/Off when communicating with ODU)
LD06L	LED6	Error Status (Repeat On/Off when error occurs)

# AHU COMMUNICATIONS KIT INSTALLATION

## Solutions Overview

### Defrost Operation

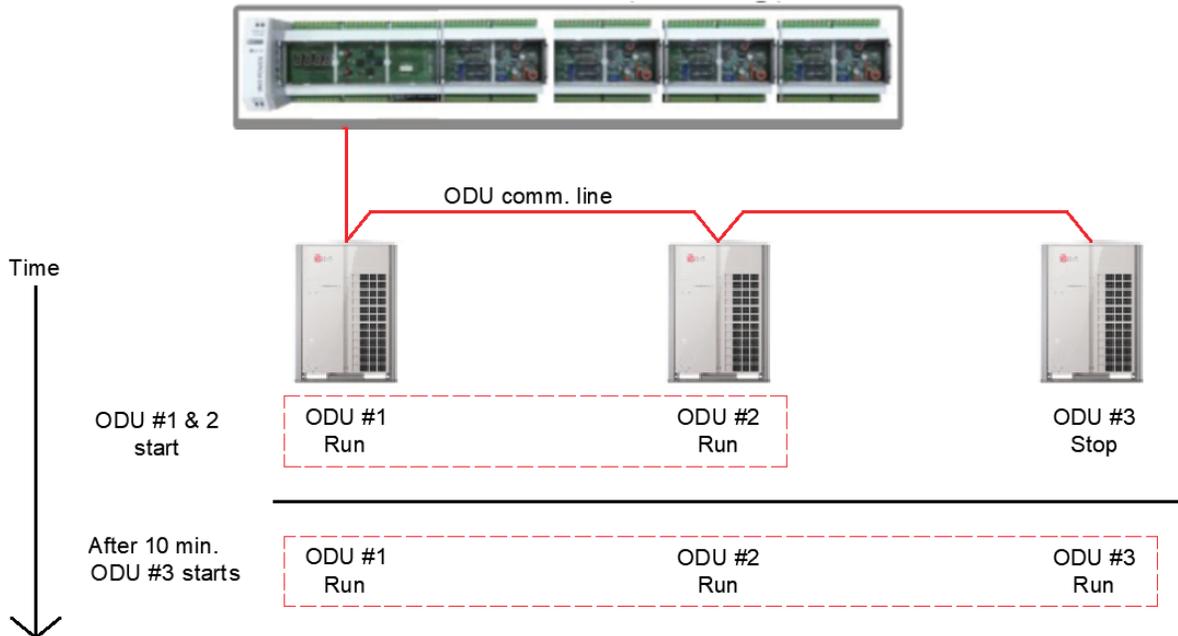
It is a function to prevent outdoor units from simultaneously entering defrost when two or more outdoor units are linked. The defrost operation function is only applied to the MULTI V outdoor unit (after MULTI V 5).

### Sequential Startup Control of Outdoor Unit

- Operating condition : Power on → Heating operation command
- Stop condition : Power off or stop command
- Function operation
  1. This function is available when DIP switch is set to the Sequential Start Up.
  2. In order to prevent the outdoor unit from entering the defrosting at the same time of heating operation, only half of the outdoor unit is in operation and the remaining outdoor units are operated after 10 minutes when the operation command is received. (Sequential Start up is not operated in case of cooling operation)

#### Example ODU Startup Control

AHU ON Command (Heating)

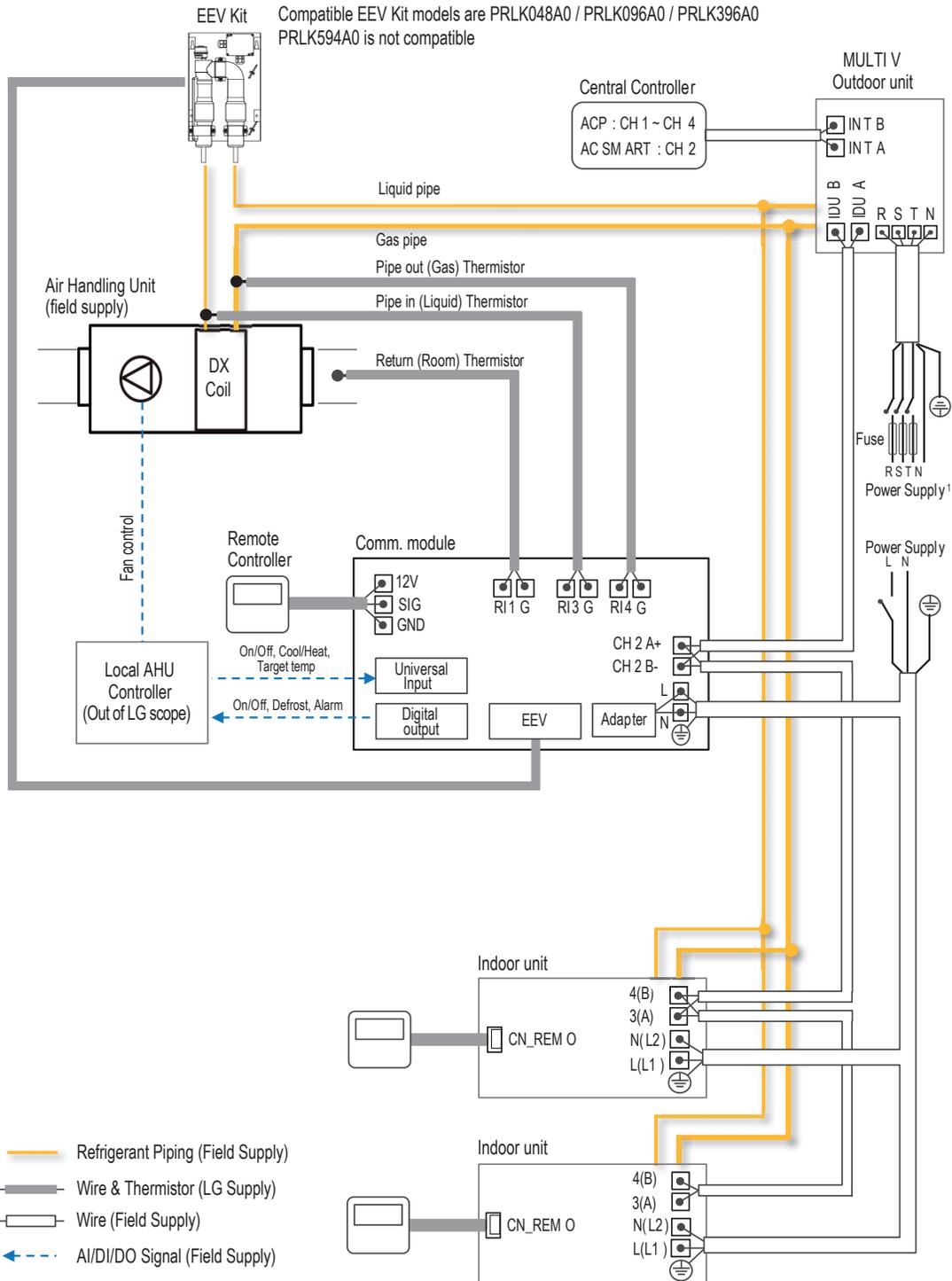


# AHU COMMUNICATIONS KIT INSTALLATION

## External Connection Diagrams

### Return Air Temperature Control

Multi V and EEV Kit and DDC (Contact Signal)



**Notes:**

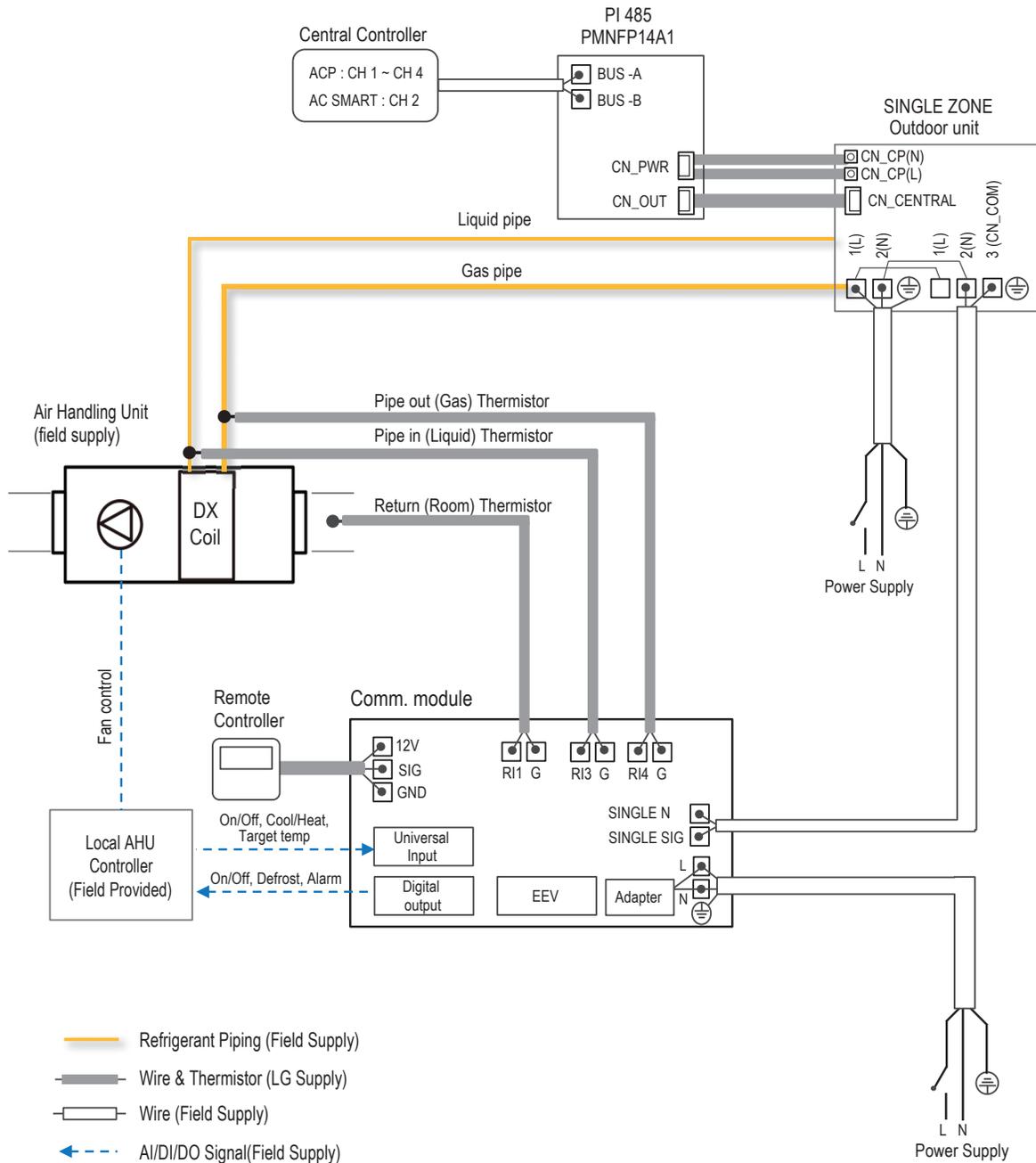
1. The type of power supply of outdoor unit can vary depending on the outdoor model.
2. Please make wiring between LG controller and outdoor unit with the same polarity.
3. LG controller can be optionally applied with DDC.

# AHU COMMUNICATIONS KIT INSTALLATION

## External Connection Diagrams

### Return Air Temperature Control

Single Zone and DDC (Contact Signal)



Note :

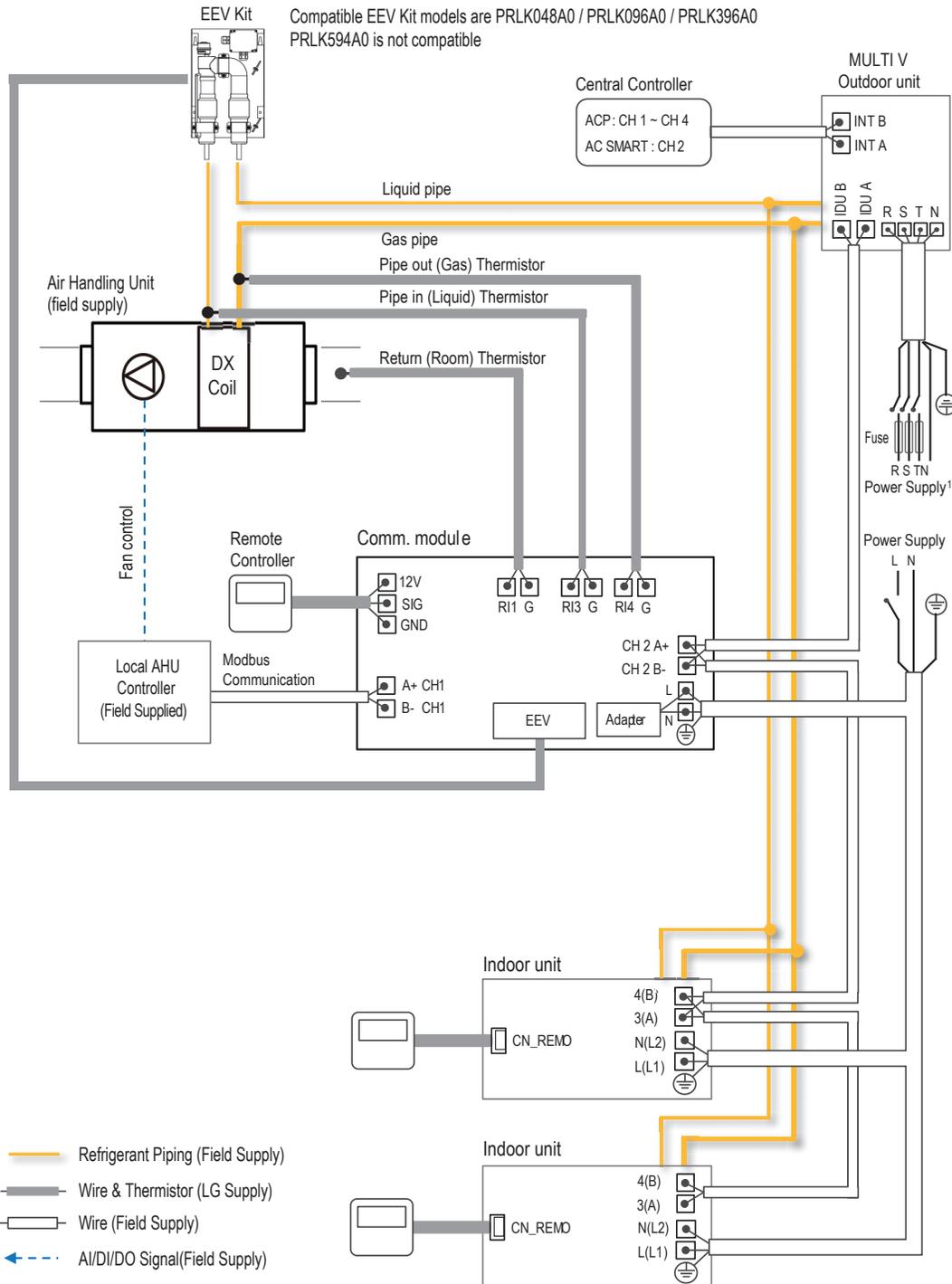
1. The type of power supply of outdoor unit can vary depending on the outdoor model.
2. Please make wiring between LG controller and outdoor unit with the same polarity.
3. LG controller can be optionally applied with DDC.

# AHU COMMUNICATIONS KIT INSTALLATION

## External Connection Diagrams

### Return Air Temperature Control

Multi V and EEV Kit and LG Control/DDC (Modbus Signal)



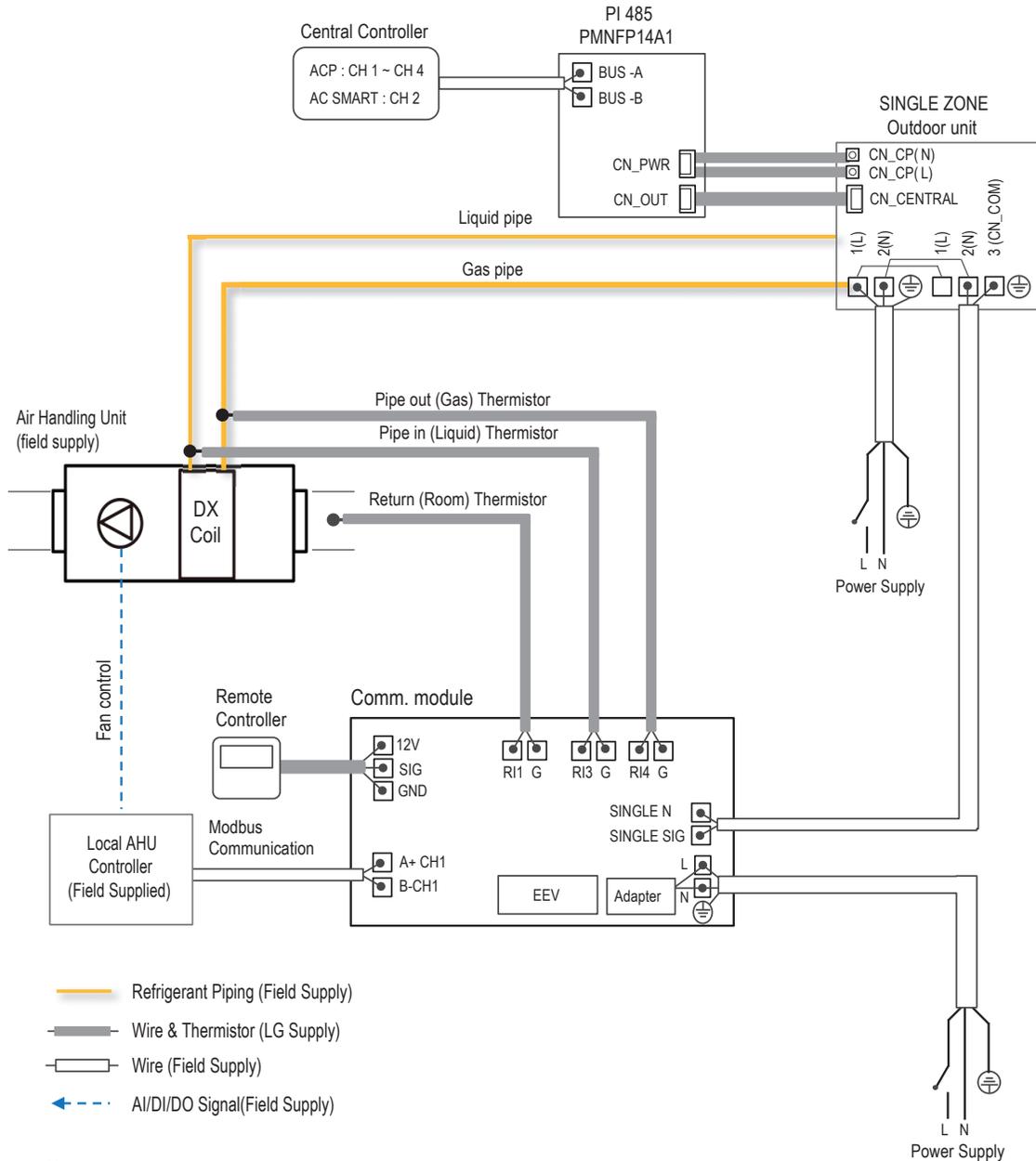
**Notes:**

1. The type of power supply of outdoor unit can vary depending on the outdoor model.
2. Please make wiring between LG controller and outdoor unit with the same polarity.
3. LG controller can be optionally applied with DDC.

# AHU COMMUNICATIONS KIT INSTALLATION

## External Connection Diagrams

### Return Air Temperature Control Single Zone and LG Control/DDC (Modbus Signal)

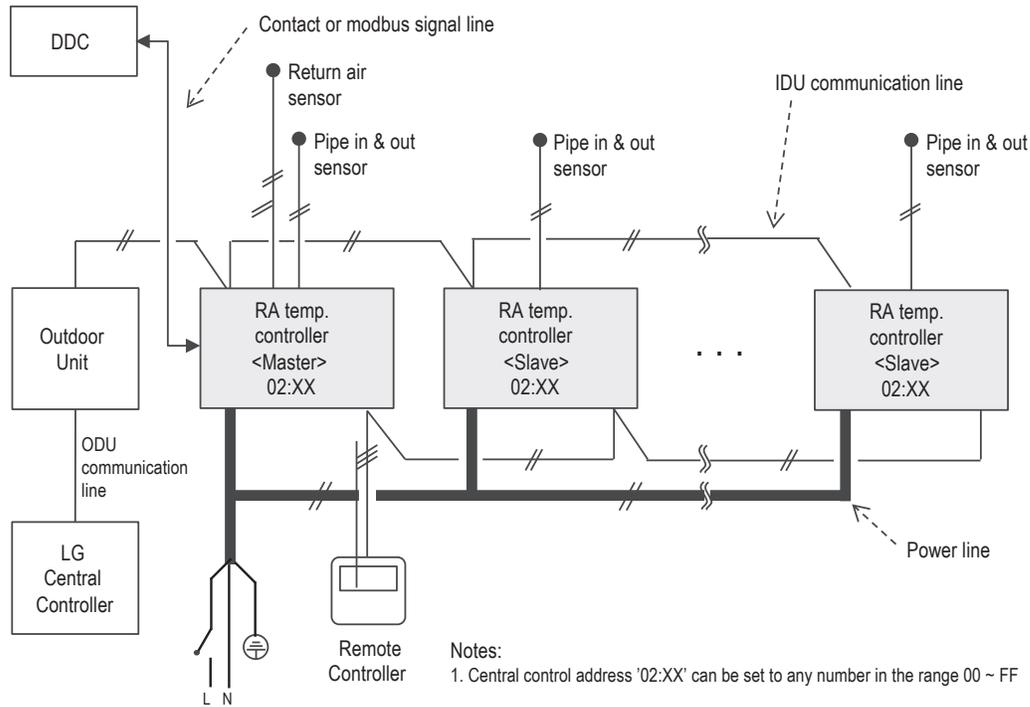


# AHU COMMUNICATIONS KIT INSTALLATION

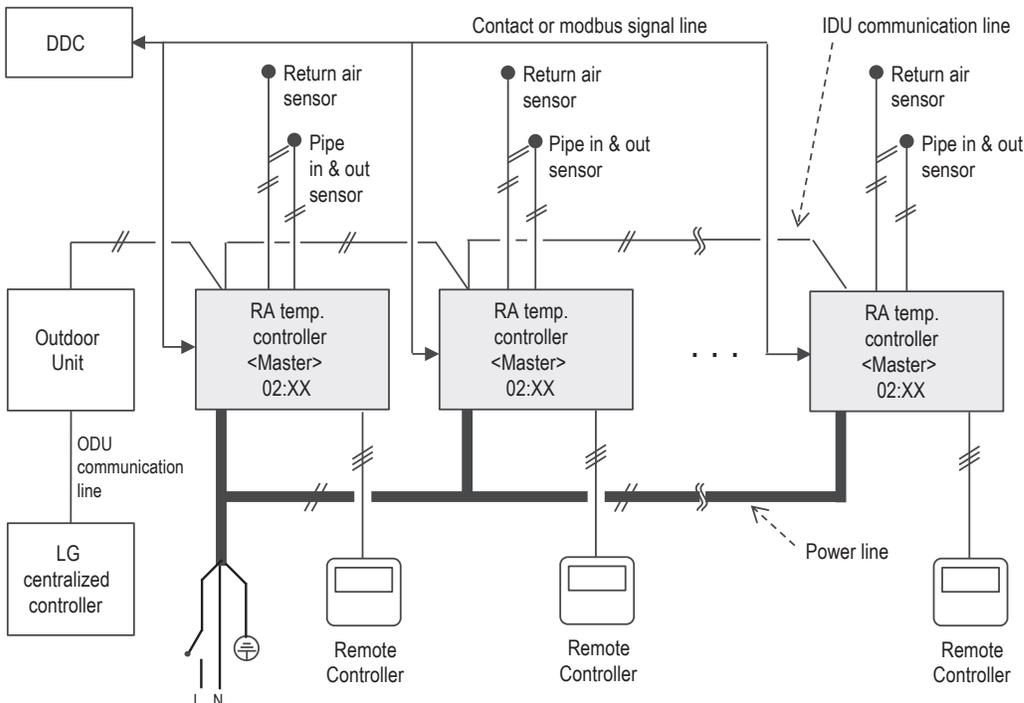
## External Connection Diagrams

### Multiple Modules Installation

#### One Air Handling Unit



#### Multiple Air Handling Units



# AHU COMMUNICATIONS KIT INSTALLATION

## Control Functions

### BMS Protocol - PAHCMR000 BACnet Points

#### AHU Control and Monitor Points

No.	Name	Object Name (XX : Unit Address Number)	Object Type	Unit						
				Inactive	Active					
				TEXT-0	TEXT-1	TEXT-2	TEXT-3	TEXT-4	TEXT-5	
1	On/Off (Setting)	ac_StartStopCommand_XX	BO	Stop(0)	Start(1)					
2	On/Off (Status)	ac_StartStopStatus_XX	BI	Stop(0)	Start(1)					
3	Lock (Setting)	ac_LockCommand_XX	BO	Permit(0)	Prohibit(1)					
4	Lock (Status)	ac_LockStatus_XX	BI	Permit(0)	Prohibit(1)					
5	Operation Mode (Setting)	ac_AirConModeCommand_XX	MO		Cool(1)		Fan(3)		Heat(5)	
6	Operation Mode (Status)	ac_AirConModeStatus_XX	MI		Cool(1)		Fan(3)		Heat(5)	
7	Fan Speed (Setting) <sup>1</sup>	ac_FanSpeedCommand_XX	MO		Low(1)	Middle(2)	High(3)			
8	Fan Speed (Status) <sup>1</sup>	ac_FanSpeedStatus_XX	MI		Low(1)	Middle(2)	High(3)			
9	Set Room Temperature	ac_SetRoomTemp_XX	AV	60 ~ 80 °F						
10	Room Temperature	ac_RoomTemp_XX	AI	-146.2 ~ 210.2 °F						
11	Alarm	ac_Alarm_XX	BI	Normal(0)	Abnormal(1)					
12	Error Code	ac_MalfunctionCode_XX	AI	0~255 (Refer to error code list in LG central controller manual)						
13	Set Temperature (Status)	ac_SetTempStatus_XX	AI	60 ~ 80 °F						
14	Set Upper Temperature (Setting)	ac_TempRangeUpperLimitCommand_XX	AV	60 ~ 80 °F						
15	Set Lower Temperature (Setting)	ac_TempRangeLowerLimitCommand_XX	AV	60 ~ 80 °F						
16	Set Upper Temperature (Status)	ac_TempRangeUpperLimitStatus_XX	AI	60 ~ 80 °F						
17	Set Lower Temperature (Status)	ac_TempRangeLowerLimitStatus_XX	AI	60 ~ 80 °F						
18	Mode Lock (Setting)	ac_ModeLockCommand_XX	BO	Permit(0)	Prohibit(1)					
19	Mode Lock (Status)	ac_ModeLockStatus_XX	BI	Permit(0)	Prohibit(1)					
20	Fan Lock (Setting)	ac_FanLockCommand_XX	BO	Permit(0)	Prohibit(1)					
21	Fan Lock (Status)	ac_FanLockStatus_XX	BI	Permit(0)	Prohibit(1)					
22	Thermo Status (Status)	ac_ThermoStatus_XX	BI	Off(0)	On(1)					

Notes:

1. For fan speed control, DIP SW 1-3 must be set to On.
2. ACP BACnet gateway is required for BACnet protocol.
3. For more details, refer to the LG central controller manual.

# AHU COMMUNICATIONS KIT INSTALLATION

## Control Functions

### BMS Protocol - PAHCMR000 BACnet Points

#### Outdoor Unit Monitor Points

No.	Name	Object Name (XX : Unit Address Number)	Object Type	Unit					
				Inactive	Active				
				TEXT-0	TEXT-1	TEXT-2	TEXT-3	TEXT-4	TEXT-5
1	Compressor Operation Status	outdoor_CompOperStatus_XX	BI	Stop(0)	Run(1)				
2	Refrigent Type	outdoor_RefrigentType_XX	MI		R407C(1)	R22(2)	R410A(3)		
3	Inverter Fan 1 frequency	outdoor_InverterFanFreq_XX	AI	-					
4	High Pressure	outdoor_HighPressure_XX	AI	-					
5	Low Pressure	outdoor_LowPressure_XX	AI	-					
6	Suction Temperature	outdoor_SuctionTemp_XX	AI	°F					
7	Liquid Pipe Temperature	outdoor_LiquidPipeTemp_XX	AI	°F					
8	Heat Exchanger Temperature	outdoor_HexTemp_XX	AI	°F					
9	Outdoor EEV	outdoor_OutdoorEEV_XX	AI	-					
10	Subcool EEV	outdoor_SubCoolEEV_XX	AI	-					
11	Hot Gas Valve	outdoor_HotgasValue_XX	BI	Stop(0)	Run(1)				
12	Inverter Discharge Temperature	outdoor_InverterDischargeTemp_XX	AI	°F					
13	Outdoor Temperature	outdoor_OutdoorTemp_XX	AI	°F					
14	Operation Mode	outdoor_OperationMode_XX	MI		STOP(1)	COOL(2)	HEAT(3)		

Installation

#### Notes:

1. ACP BACnet gateway is required for BACnet protocol.
2. For more details, refer to the LG central controller manual.



# AHU COMMUNICATIONS KIT INSTALLATION

## Control Functions

### BMS Protocol - PAHCMR000 LonWorks Points

#### Modbus Points - Function Codes

Code	Description	Register
0x01	Read Coils	00001~00008
0x02	Read Discrete inputs	10001~10008
0x03	Read Holding Registers	40001~40010
0x04	Read Input Registers	30001~30008
0x05	Write Single Coil	00001~00008
0x06	Write Single Holding Register	40001~40010

#### Modbus Points - Memory Map

Register	Description	Function Code						Value explanation
		1	2	3	4	5	6	
00001	Operating On / Off	●	-	-	-	●	-	0: Off / 1: On
00002	Reserved	-	-	-	-	-	-	-
00003	All Button Lock	●	-	-	-	●	-	0: Unlock / 1: Lock
00004	Mode Lock	●	-	-	-	●	-	0: Unlock / 1: Lock
00005	Fan Speed Lock	●	-	-	-	●	-	0: Unlock / 1: Lock
00006	Target Temp. Lock	●	-	-	-	●	-	0: Unlock / 1: Lock
00007	Error	●	-	-	-	-	-	0: Normal / 1: Error
00008	Reserved	-	-	-	-	-	-	-
10001	Comp Status	-	●	-	-	-	-	0: Off / 1: On
10002	Defrost Status	-	●	-	-	-	-	0: Normal / 1: Defrost
10003	Oil Return	-	●	-	-	-	-	0: Normal / 1: Oil Return
10004	Reserved	-	-	-	-	-	-	-
10005	Reserved	-	-	-	-	-	-	-
10006	Reserved	-	-	-	-	-	-	-
10007	Reserved	-	-	-	-	-	-	-
10008	Reserved	-	-	-	-	-	-	-
30001	Error Code	-	-	-	●	-	-	0~255
30002	RA Temp.	-	-	-	●	-	-	-58 ~ 212 °F (x10)
30003	Reserved	-	-	-	-	-	-	-
30004	Pipe In Temp.	-	-	-	●	-	-	-58 ~ 212 °F (x10)
30005	Pipe Out Temp.	-	-	-	●	-	-	-58 ~ 212 °F (x10)
30006	Capacity	-	-	-	●	-	-	0~255 [kBtu]
30007	Reserved	-	-	-	-	-	-	-
30008	Reserved	-	-	-	-	-	-	-
40001	Operation Mode	-	-	●	-	-	●	0: Cooling / 2: Fan / 4: Heating
40002	Fan Speed	-	-	●	-	-	●	1: Low / 2: Middle / 3: High
40003	Target Temp.	-	-	●	-	-	●	14 ~ 212 °F (x10)
40004	Target Temp. Upper Range	-	-	●	-	-	●	60 ~ 86 °F (x10, 1.0 °F)
40005	Target Temp. Lower Range	-	-	●	-	-	●	60 ~ 86 °F (x10, 1.0 °F)
40006	Reserved	-	-	-	-	-	-	-
40007	Reserved	-	-	-	-	-	-	-
40008	Reserved	-	-	-	-	-	-	-
40009	Reserved	-	-	-	-	-	-	-
40010	Reserved	-	-	-	-	-	-	-

#### Notes:

1. Configuration is 9600bps, parity none, and stop bit 1.
2. To change slave address, refer to main module address setting.

# EEV KIT INSTALLATION

## Introduction, Specifications, and Design Parameters

### Introduction

When used with the LG AHU Communications Kit (sold separately), the LG EEV Kit controls refrigerant flow between LG Multi V air-source or water-source units and a third-party air handler unit (AHU).

The EEV Kits are offered in four sizes:

- PRLK048A0 supports 12 through 96 MBH (8 tons maximum)
- PRLK096A0 supports 96.1 through 192 MBH (16 tons maximum)
- PRLK396A0 supports 192.1 MBH through 396 MBH (32 ton maximum)
- PRLK594A0 supports 396.1 MBH through 594 MBH (48 maximum)

### Specifications

Table 9: EEV Kit Specifications Table.

Model Number	PRLK048A0	PRLK096A0	PRLK396A0
For Use With	PAHCMR000 and PAHCMS000		
Power Supply Requirements	Powered by Air Handler Unit Comm Kit (12 VDC)		
Ambient Operating Temperature Range	- 4 to 149F		
Ambient Operating Humidity Range	0 to 98% (Non-condensing)		
Dimensions (in., W x H x D)	8-5/8 x 15-15/16 x 3-5/16	13-25/32 x 7-3/32 x 13-39/64	
Net Weight (lbs.)	6.8		11.0
Shipping Weight (lbs.)	7.9		12.1
Maximum Air Handler Unit Capacity (Btu/h)	96,000	192,000	396,000
Communications Cable	AWG 18 x 6 Stranded, Shielded Copper Wire		
Refrigerant Type	R410A		

Figure 16: EEV Kit.



Table 10: EEV Kit Compatibility Table.

EEV Kit	AHU Communication Kit	
	PAHCMR000	PAHCMS000
PRLK048A0 (8 tons max)	HP/HR	HP
PRLK096A0 (16 tons max)	HP	HP
PRLK396A0 (32 tons max)	HP	HP
PRLK594A0 (48 tons max)	NA	HP (requires EEV module)

HP = Heat Pump; HR = Heat Recovery

### EEV Kit Design Parameters

- Maximum of one (1) EEV Kit can be connected to one (1) AHU Communications Kit.
- Minimum coil entering air temperature for heating mode is 41°F.
- Requires field-supplied six-conductor communication cable to connect to AHU Communications Kit.
- Maximum distance between EEV Kit and AHU Communications Kit is thirty-two (32) feet.
- Designed for indoor installations (field-supplied waterproof enclosure must be used when installing outdoors).

# EEV KIT INSTALLATION

## Parts

Figure 17: PRLK048A0 and PRLK096A0 EEV Parts.

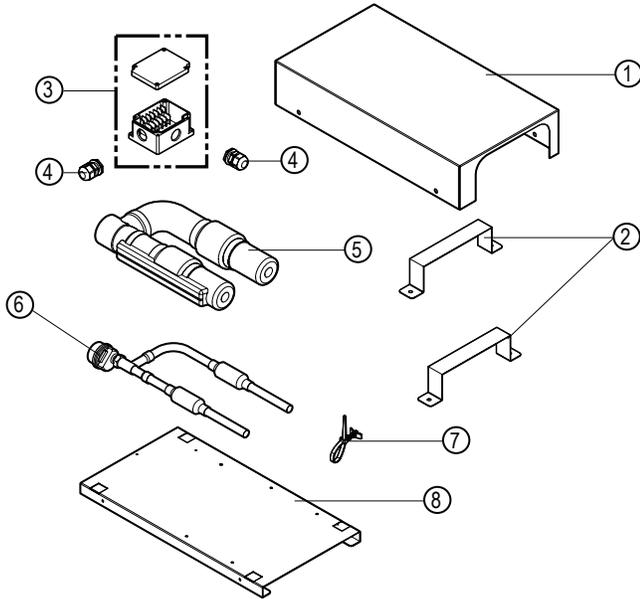


Table 11: PRLK048A0 and PRLK096A0 EEV Parts Table.

Diagram Label	Part Name	Quantity
1	Top Panel	One (1)
2	Bracket	Two (2)
3	Terminal Box	One (1)
4	Cable Connectors	Two (2)
5	Pipe Insulation	One (1)
6	Electronic Expansion Valve Assembly (EEV, Strainer, Tube)	One (1)
7	Support Tie	One (1)
8	Bottom Panel	One (1)

Figure 18: PRLK396A0 EEV Parts.

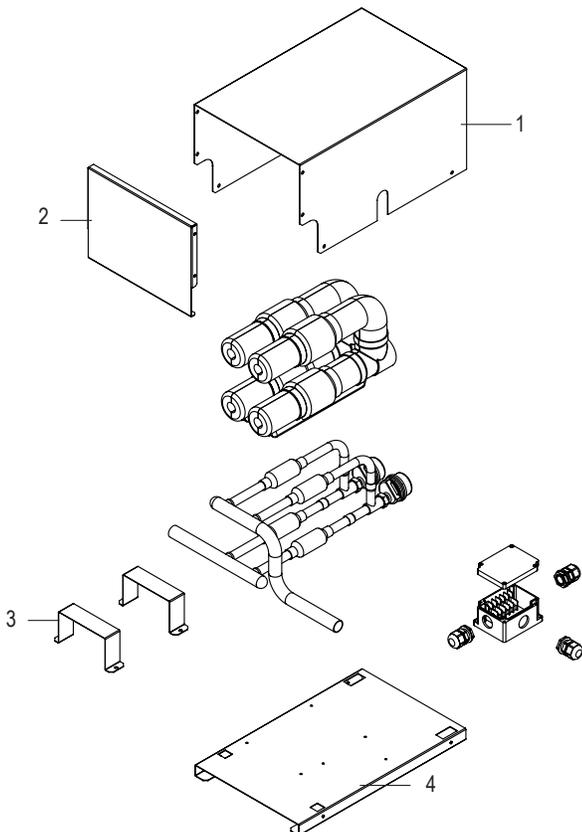


Table 12: PRLK396A0 EEV Parts Table.

Diagram Label	Part Name	Quantity
1	Panel A, Upper	One (1)
2	Panel B, Upper	One (1)
3	Bracket	Two (2)
4	Panel, Base	One (1)

# EEV KIT INSTALLATION

## Mounting the EEV Kit

### Mounting the PRLK048A0/ PRLK096A0 EEV Kit

1. Remove the Top Panel by unscrewing the screws at the four (4) corners.
2. Using the Bottom Panel as a template, mark the location on the wall or ceiling where the holes for the screws should be placed. Drill the four (4) holes.
3. Attach the EEV Bottom Panel securely using four (4) field-supplied 1/4 inch long screws.

Figure 19: Removing the Screws.

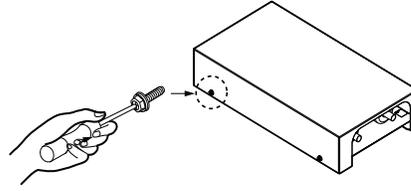
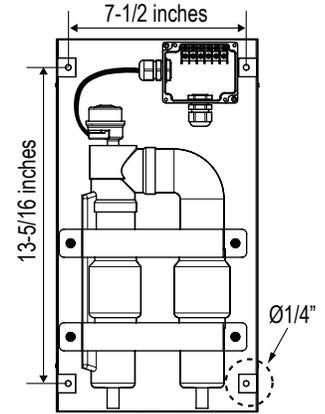
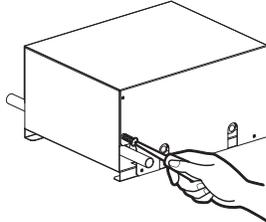


Figure 20: EEV Bottom Panel Hole Dimensions.

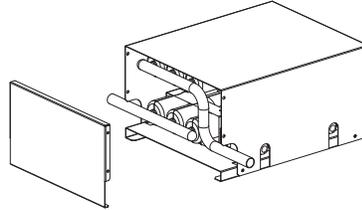


### Mounting the PRLK396A0 EEV Kit

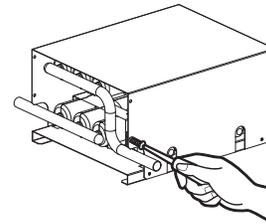
1. Remove the two screws from the EEV kit base plate



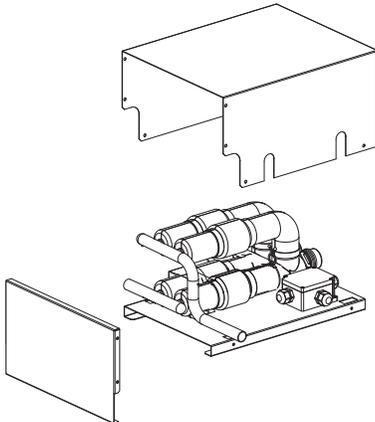
2. Remove the base plate.



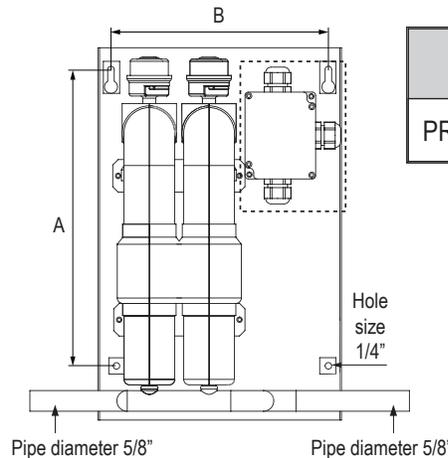
3. Remove the four screws from the cover plate



4. Remove the cover plate



5. Drill holes in the correct locations and use 4 field-provided screws to secure the EEV kit.



Model	length (inch)	
	A	B
PRLK396A0	10-3/4	7-1/2

# EEV KIT INSTALLATION

## Preparing the Pipes

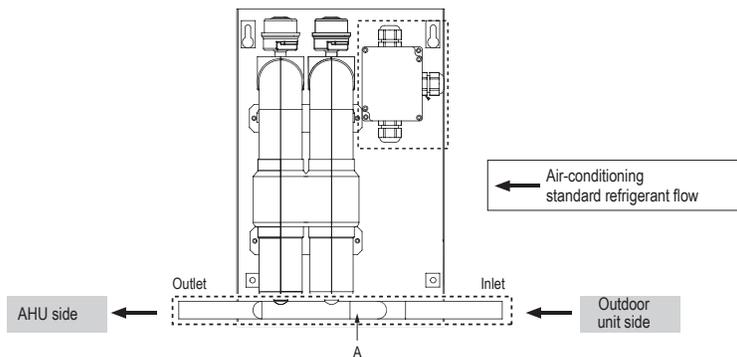
### Preparing the Pipes

#### PRLK048A0 and PRLK096A0

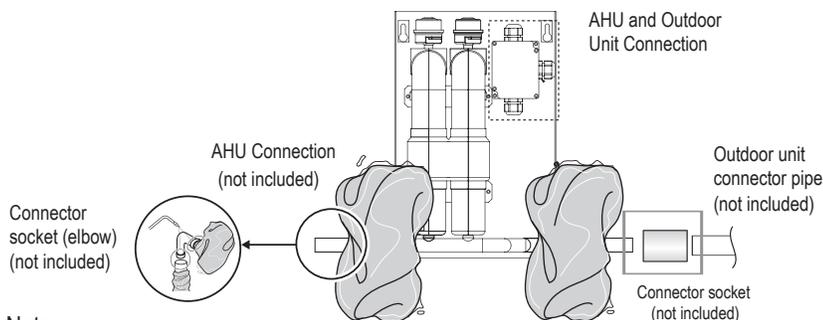
1. Unscrew the four (4) M4 screws and detach the two (2) EEV Assembly pipe support brackets.
2. Remove the EEV Assembly; remove the pipe insulation from the EEV Assembly.
3. If cutting pipe, refer to the cutting instructions on the next page.
4. Braze the field-supplied inlet / outlet piping to the EEV Assembly. See next page for brazing instructions.

#### PRLK396A0

- 1 Check the inlet/outlet pipe before brazing the EEV KIT.



- 2 If cutting pipe, refer to the cutting instructions on the next page.
- 3 Braze the connector pipe (not provided) at the outdoor unit.
- 4 When connecting the outdoor unit's connector pipe and the EEV KIT pipe, be sure to use a socket (not provided) that meets the necessary specifications.
- 5 As the size of the EEV KIT pipe and the outdoor unit's connector pipe could vary, check the sizes beforehand and use a socket that meets the necessary specifications.
- 6 When brazing, make sure to follow safety precautions at all times.
- 7 Be sure to insulate pipe A after welding with insulation (15T or more).



#### Notes:

Be sure to pass nitrogen through when brazing. Failure to do so could cause the compressor to not function properly or become damaged.

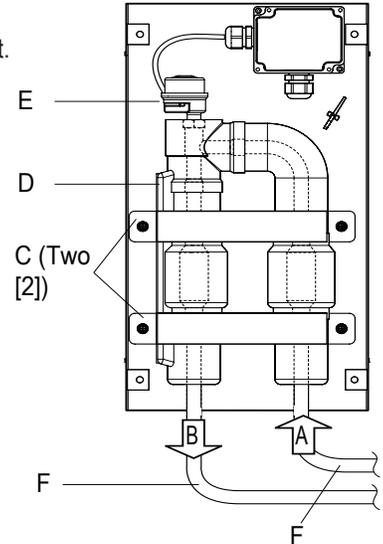
It is essential that the pipe is wrapped with a wet towel before and after brazing. Failure to do so could result in equipment damage.

Use a protective panel or be especially cautious not to let welding sparks come in contact with the AHU panel.

After brazing, be sure to test for leakage.

Failure to properly insulate the pipe after welding may result in leakage.

Figure 21: PRLK048A0 and PRLK096A0 EEV Kits.



# EEV KIT INSTALLATION

## Brazing and Insulating the Piping

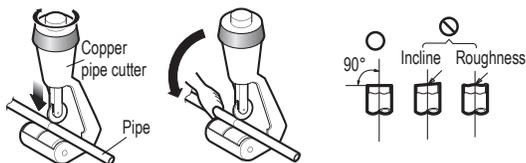
### Cutting Pipe

#### Notes:

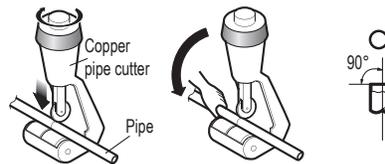
The presence of burrs can result in refrigerant leakage. Remove any burrs with a reamer.

Cutting dust could lead to malfunctioning if it gets inside the pipe.

- 1 Use a copper pipe cutter to cut the pipe in a straight line.



- 2 When cutting, tilt the pipe end downward to prevent burrs from getting inside the pipe. After cutting, use a reamer to remove any burrs from inside the pipe.



### Brazing

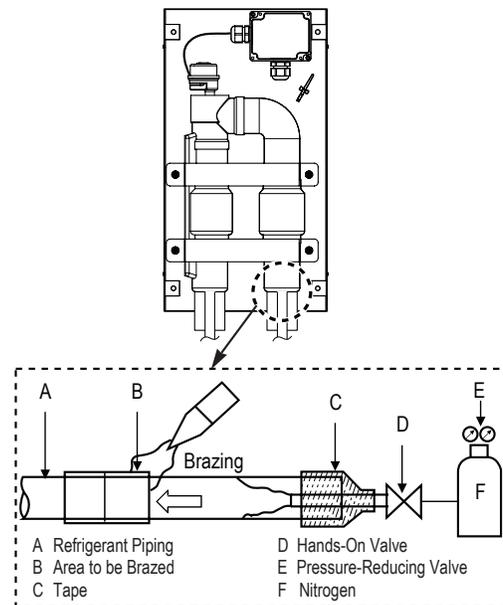
- Use a nitrogen purge set to 0.02 MPa while brazing.

#### Note

*Brazing without a nitrogen purge will create a large amount of oxidization on the inside of the pipes, adversely affecting valves and compressors in the refrigerating system and preventing normal system operation.*

- When brazing the field piping to the EEV Kit Assembly, use a wet cloth to protect and ensure that the main EEV body temperature does not exceed 248°F.
- Make sure that the other parts such as electrical box, support ties, and wiring are also protected from direct flames during brazing.
- After brazing is complete, use medical grade dry nitrogen and pressure test the refrigerant piping system to a minimum of 550 psi for a period of 24 hours. Pressurize the liquid, low pressure vapor, and high pressure vapor pipes (heat recovery systems only) of the air-source / water-source units concurrently. The test must be done with the air-source / water-source unit service valves closed. (For more details, refer to the manual of the respective air-source / water-source installation manuals.)

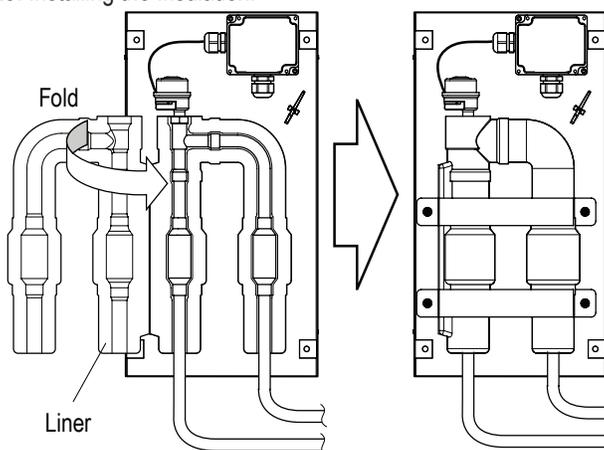
Figure 22: Brazing Field Piping to EEV Assembly.



### Insulating the Piping

1. After brazing is complete, place the Pipe Insulation back on the EEV Assembly. Peel off the liner, fold the insulation as shown in the figure at right, and press down to seal.
2. Fully insulate the field piping up to the EEV Assembly. To avoid condensation, make sure there are no gaps between the field piping insulation and the EEV Assembly insulation. Finish the connection with tape.
3. To secure the EEV Assembly, re-install the two (2) pipe support brackets using the four (4) M4 screws.

Figure 23: Installing the Insulation.



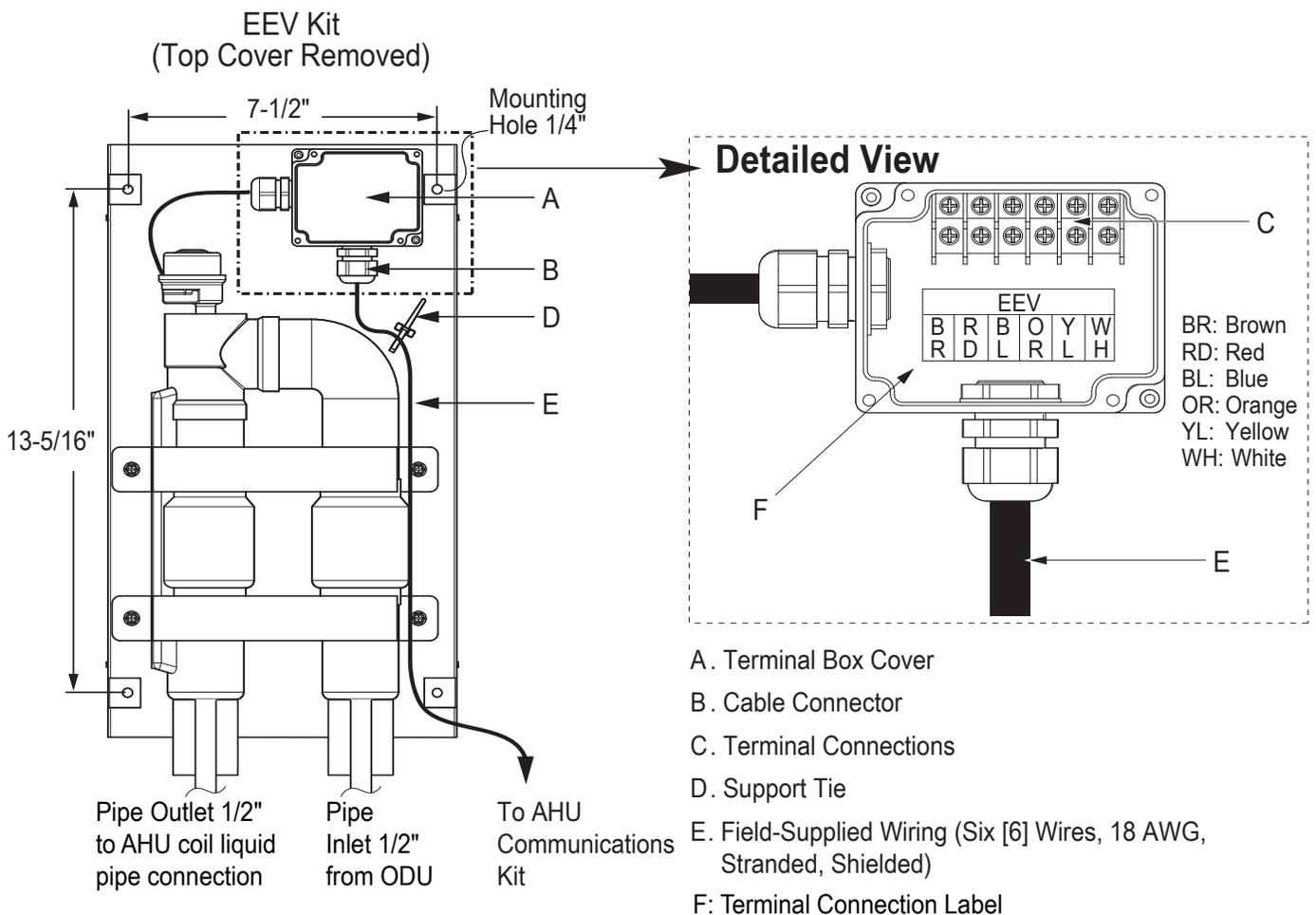
# EEV KIT INSTALLATION

## PRLK048A0 and PRLK096A0 Wiring

### Wiring Installation

1. Open the terminal box cover (A) by unscrewing the four (4) M4 screws.
2. Run field-supplied wiring (six [6] wired, 18AWG, stranded, shielded copper) to / from the AHU Communications Kit through the cable connector on the EEV Kit.
3. Connect wiring to the terminal connections as shown (C), following the label and color codes pasted onto the bottom of the terminal box and listed on the AHU Communications Kit PCB diagram. Securely tighten all connections.
4. Route the wiring through and out the EEV Kit as shown, and secure with the support tie (D).
5. Re-install the terminal box cover (A) and secure with the four (4) M4 screws.
6. Taking care not to damage the field-supplied wiring or insulation, reattach EEV Kit top panel by securing with screws at four (4) corners.

Figure 24: PRLK048A0 and PRLK096A0 EEV Kit Wiring.



Installation

### Note

Before connecting the field-supplied wiring, compare with the connection labels between EEV Kit and AHU Communications Kit. Connect the wiring according to the PCB diagram for the AHU Communications Kit. If the wiring is incorrect, the products will malfunction.

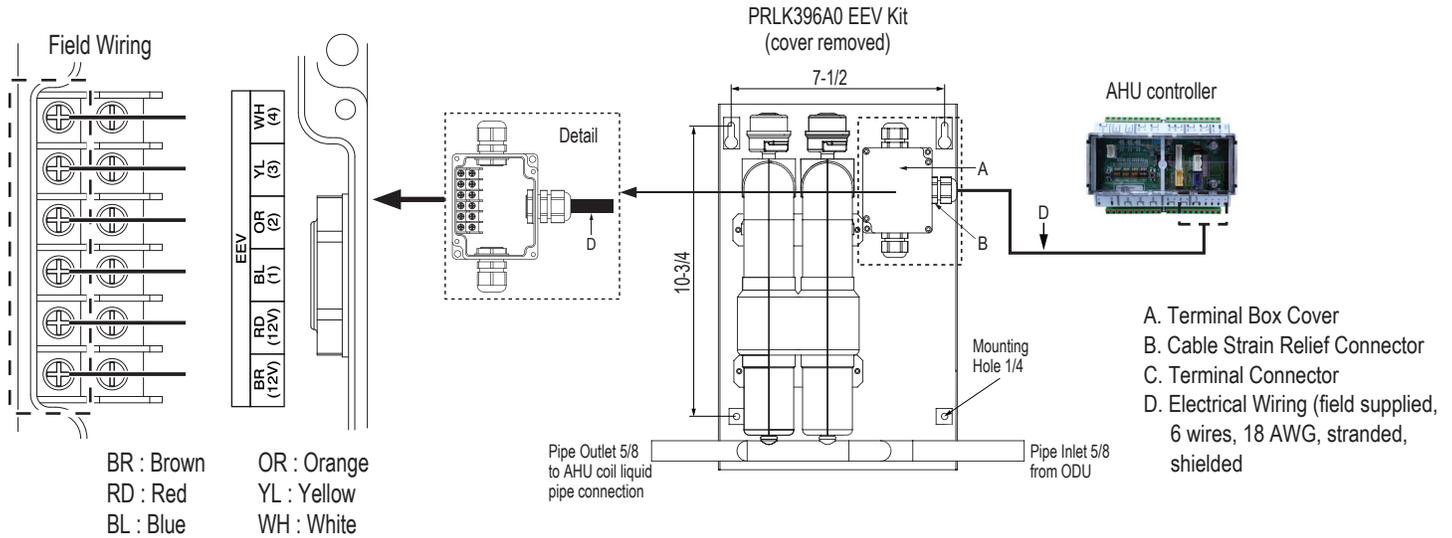
# EEV KIT INSTALLATION

## PRLK396A0 Wiring

### Wiring Installation

1. Open the terminal box cover.
2. For PRLK396A0, run the field-supplied wiring (six [6] wired, 18AWG, stranded, shielded copper) to / from the AHU Communications Kit through the cable connector on the EEV Kit.
3. Connect wiring to the terminal connections following the label and color codes pasted onto the bottom of the terminal box and shown below. Securely tighten all connections.
4. Route the wiring through and out the EEV Kit as shown, and secure with the support tie (D).
5. Re-install the terminal box cover and secure the cover with the four (4) screws.
6. Taking care not to damage the field-supplied wiring or insulation, reattach the EEV Kit Top Panel by securing it with the screws at the four (4) corners.

Figure 25: PRLK396A0 EEV Kit Wiring.

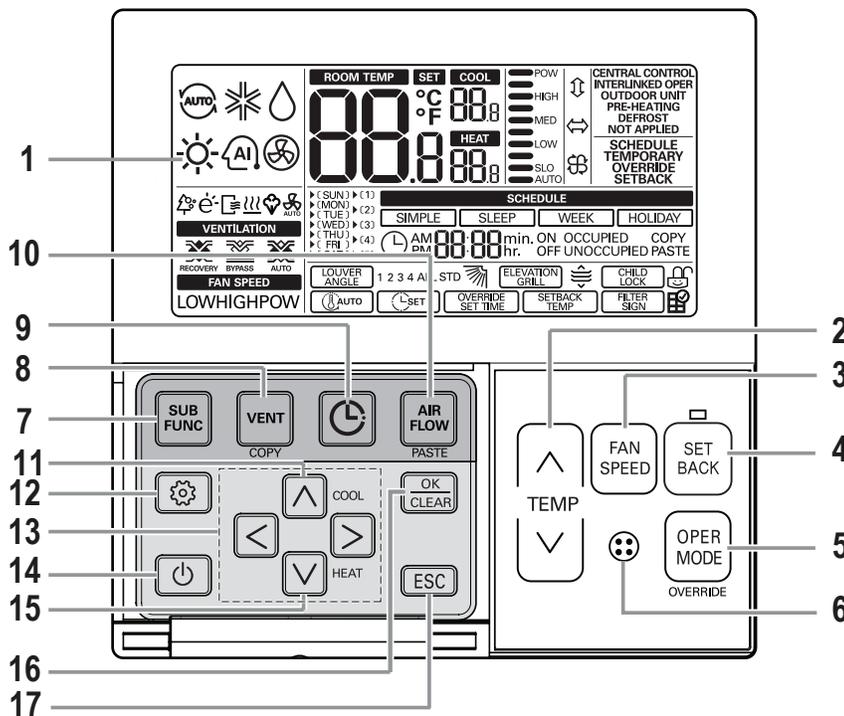


## Testing

Before testing, make sure all information is understood completely, and follow the guidelines listed in this manual.

- Check the air-source / water-source unit refrigerant piping, additional refrigerant charge, maximum allowable piping length, and opening the shut-off valve. (For more detailed information, see the respective air-source / water-source unit installation manual).
- Operate the testing procedure.
  1. Connect the power, and turn the system on.
  2. Check remote controller for error codes.

Figure 26: Wired Remote Controller Buttons.



1. Operation indication screen
2. Set temperature button
3. Fan Speed button
4. Set back button
5. Operation mode selection button
6. Wireless receiver - some equipment are not equipped to receive the wireless signals
7. Sub-function button
8. Ventilation button
9. Reservation button
10. Air flow button
11. Cooling desired temperature
12. Function setting button
13. Up, Down, Left, Right button
14. On/Off button
15. Heating desired temperature
16. Setting / Cancel button
17. Exit button

### Note

- For more detailed function of the wired remote controller, refer to its Owner's / Installation Manual.
- Buttons 3, 4, 11, 12 on the wired remote controller do not operate.

# TROUBLESHOOTING

Table 13: Troubleshooting.

Problem	Cause	Solution
AHU Communications Kit Does Not Work	No Power	Check the power supply electrical connections and voltage.
	Wiring is Incorrect	Check the AHU Communications Kit electrical connections (see wiring diagram).
	AHU Communications Kit is Damaged	Check AHU Communications Kit electrical and mechanical components.
EEV Kit Does Not Work	Wiring is Incorrect	Check the EEV Kit electrical connections.
	Piping is Incorrect	Check the piping connections between the EEV Kit and the outdoor unit.

## Error Codes

- The error code function indicates when an operation failure occurs in the system, and provides self-diagnosis about the type of error.
- The error code is displayed on the wired remote controller and the control board LED on the air-source / water-source unit.
- If two or more two errors occur simultaneously, the smallest of the error code numbers is displayed first.
- When the problem causing the error code to appear is fixed, then the error code will immediately stop displaying on the LED.

Table 14: Error Code Table.

Error Code	Description	Details
CH01	Return Air (Room) Thermistor Error	Return air (room) thermistor has disconnected from AHU, or has short circuited.
CH02	Pipe In Thermistor Error	Pipe in thermistor has disconnected from AHU, or has short circuited.
CH03	Communication Error Between Wired Remote Controller and AHU Communications Kit	No communication signal for more than three (3) minutes from the controller to the AHU Communications Kit.
CH05	Communication Error Between AHU Communications Kit and Air-Source / Water-Source Unit	No communication signal for more than five (5) consecutive minutes from AHU Communications Kit to the Air-Source / Water-Source Unit.
CH06	Pipe Out Thermistor Error	Pipe out thermistor has disconnected from AHU, or has short circuited.

**Contact your local sales representative if you have any questions about the AHU Communications Kit or its installation.**



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