

MANUFACTURED FOR:  
MITSUBISHI ELECTRIC US, INC.

Air Conditioners

**PAA-A18, 24, 30, 36, 42AA1/BA1/CA1**

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SERVICE MANUAL

# Table of Contents

1. SAFETY PRECAUTIONS .....	3
1.1. Before service and electric work .....	3
1.2. Devices that use R410A refrigerant .....	10
1.3. Before getting started .....	11
1.4. Before servicing or moving the PAA unit - electrical work .....	16
1.5. Before starting the test run .....	18
1.6. To dispose of the PAA unit .....	19
2. INSTALLATION POSITIONS AND CORRESPONDING AIRFLOW DIRECTION .....	20
3. SPECIFICATIONS .....	21
4. INTERNAL PRESSURE DROP .....	22
5. OUTLINES AND DIMENSIONS .....	25
6. WIRING DIAGRAM .....	28
7. REFRIGERANT SYSTEM DIAGRAM .....	30
8. TEST MODE AND EMERGENCY MODE .....	31
9. HUMIDIFIER CONTROL SPECIFICATIONS .....	36
9.1. Humidifier .....	36
9.2. Installation .....	38
10. ERV (ENERGY RECOVERY VENTILATION) CONTROL .....	39
10.1. Energy recovery ventilation (ERV) .....	39
10.2. Installation .....	40
10.3. HRV/ERV heating operation for MXZ system .....	40
11. TROUBLESHOOTING .....	41
11.1. Cautions on troubleshooting .....	41
11.2. Self-check function, Function Table .....	42
11.3. Self-diagnosis action table .....	44
11.4. Troubleshooting by inferior phenomena .....	49
11.5. Test point diagram .....	50
11.5.1. Power supply board .....	50
11.5.2. Indoor controller board .....	51
11.6. Trouble criterion of main parts .....	52
11.7. Thermistor .....	53
12. FUNCTIONS OF DIP SWITCH AND JUMPER WIRE .....	54
13. DISASSEMBLY PROCEDURE .....	55

# 1. SAFETY PRECAUTIONS

- Before servicing the unit, make sure you read all the safety precautions.
- Ensure all the equipment is properly installed per the installation manual.
- Ensure all precautions are followed.
- Carefully read the labels affixed to the main unit.

Symbols used in text:



## **WARNING**

Describes precautions that should be observed to prevent the danger of injury or death to the user.



## **CAUTION**

Describes precautions that should be observed to prevent damage to the unit.

## 1.1. Before service and electric work



## **IMPORTANT**

The Environmental Protection Agency of the United States (EPA) and Canadian Provincial environmental agencies have issued various regulations regarding the introduction and disposal of refrigerants. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines.



## **NOTE**

The service of the unit is regulated by the mechanical code adopted by the authority having jurisdiction.



## WARNING

### Risks related to PAA unit servicing

- PAA unit must be serviced by a dealer, contractor, or technician with certifications required by laws and codes.
  - Improper service by the user may result in injury or damage to the unit such as water leakage, electric shock, or fire.
- Be sure the unit is installed in a place that can withstand its weight before servicing.
  - Inadequate strength may cause the unit to fall, resulting in injuries.
- In order to prevent the PAA unit from falling during typhoons, hurricanes, earthquakes etc., be sure the unit is properly secured.
  - Improper service may cause the unit to topple and result in injury.
- Prohibit anyone without the proper qualifications from doing repairs. If the air conditioner must be repaired, consult a dealer, contractor or technician with certifications required by laws and codes.
  - If the PAA unit is repaired improperly, water leakage, electric shock, or fire may result.
- Service the air conditioner according to this service manual.
  - If the unit is serviced improperly, water leakage, electric shock, or fire may result.
- Ensure the outdoor unit cover panel is installed correctly. Please refer to the outdoor unit's manual for proper installation.
  - If the terminal cover panel is not installed correctly, dust or water may enter the outdoor unit, which could result in fire or electric shock to the user.
- Ensure that the stop valves are opened immediately after connecting, vacuuming and pressure testing the refrigerant lines when connecting the PAA unit to the outdoor unit.
  - Failure to do so may cause the PAA unit or refrigerant lines to rupture because of high-pressure refrigerant during the furnace's heating operation.
- If the PAA unit is not installed according to the installation manual, which requires a float switch, condensed water from the PAA heat exchanger will deviate from the specified path and may cause water to leak on to the heat exchanger of the gas furnace. This may cause gas, oil, and water leakage from the furnace due to corrosion over time. Furthermore, this can lead to poisoning, fire, explosion, water leakage, and bodily harm and damage to property.
- When PAA unit (this product) is supported from the ceiling in a garage or an occupied area, the product may fall due to insufficient strength of the suspension or support, or deterioration over time, etc., causing bodily harm and damage to property. In some cases, it can lead to death. Properly support the PAA unit in these situations.





## WARNING

### Electrical risks

- When sizing wire and completing electrical connections during installation, please follow local codes and standards.
  - Inadequate connections and fastening may generate heat and cause a fire.
- Have all electric work performed by a properly qualified electrician in the state where the electric work is being performed, according to the “National Electrical Code” and local electrical codes, “Interior Wire Regulations” and the instructions provided in this service manual, and always use a dedicated circuit.
  - If the power source capacity is inadequate or electric work is performed improperly, electric shock or fire may result.
- Keep the electric parts away from water.
  - It might result in electric shock, fire, or smoke.
- Do not reconstruct or change the settings of the protection devices.
  - If the pressure switch, thermal switch, float switch or other protection devices are shorted and operated forcibly, or parts other than those specified by Mitsubishi Electric are used, fire or explosion may result.
- If the supply cord is damaged, it must be replaced by the manufacturer service personnel or licensed person.
- Be sure to ground the outdoor unit in accordance with local code. Do not connect the earth cable to any gas pipe, water pipe, lightning rod, or telephone earth cable.



## WARNING

### Refrigerant leak risks

- If refrigerant gas leaks during service work, ventilate the room and do not use the furnace until a technician considers that it is safe to use the furnace.
  - If the refrigerant gas comes into contact with a flame, poisonous gases will be released. When the odor is detected, contact a dealer, contractor or technician regarding the appropriate measures to prevent the safety limit from being exceeded.
- After completing service work, make sure that refrigerant gas is not leaking.
  - If the refrigerant gas leaks and is exposed to a fan heater, stove, oven, or another heat source, it may generate noxious gases.
- Do not use refrigerant other than R410A.
  - Doing so may cause the unit or pipes to burst, or result in an explosion during use, repair, or at the time of disposal of the unit.
  - Doing so may also be in violation of applicable laws.
  - The manufacturer, Mitsubishi Electric Corporation, its affiliates and suppliers, cannot be held responsible for malfunctions or accidents resulting from the wrong type of refrigerant used.
- When the outdoor unit service valve is left closed after installation/service, or when the outdoor unit service valve is closed due to operation stop, the volume of the liquid refrigerant in the A-Coil and refrigerant piping will expand due to the heating operation in the gas furnace. This may cause the A-Coil or refrigerant piping to rupture.



## WARNING

### Fuel leak risks

- Fuel and combustion gas may flow into the room if the exhaust duct is leaking, there is a gap due to insufficient fixing of the connection part, or if regular maintenance is neglected. As a result, fatal hazards such as poisoning and fire explosion may occur, so regular maintenance is recommended to check for the following:
  - Cracked ducts
  - Clogged ducts
  - Insufficient exhaust capacity or abnormal stop of the exhaust fan of gas furnace
  - Gas leak due to gas furnace heat exchanger failure (including corrosion due to poor installation environment)
  - Incomplete combustion due to gas furnace equipment failure (malfunction / parts \* failure)
    - \* Parts refer to piping, valves, electrical wiring, electrical / electronic parts, sensors, circuit breakers, etc.
  - Short-circuit or ground fault due to ignition, tracking or insufficient insulation of gas furnace parts
  - Damage to internal and external wiring of gas furnace
  - Deterioration of heat resistance, strength, corrosion resistance, insulation, etc. of gas furnace peripheral components
  - Gas furnace protection circuit malfunction
  - Electrical components for electromagnetic noise interference due to normal use over time, parts failure, and/or installation of nearby electrical devices
  - Inadequate confirmation of recalled products from the design / manufacturing year of gas furnace
  - Maintaining an abnormal installation state by overlooking a gas furnace installation error or a red tag
- If our equipment is not installed, used, serviced, or maintained as described in the PAA unit installation/operation/service manual, the following problems may occur. In this case, stop the operation immediately by turning off the power, etc., and ask the dealer or contractor for an inspection. Otherwise, gas leaks can cause poisoning, fire, explosions, water leaks, etc., which can cause serious bodily harm and damage to property.
  - If the installation or operating environment is out of the warranty range, the control box may malfunction, and the gas furnace protection functions may also fail and disable. The effect of the excessive heat generated by the gas furnace can cause cracks in the A-Coil section resulting in refrigerant and oil leaks. Furthermore, poisoning, fire, and explosions may occur from this, doing so can cause bodily harm and damage to property.



## **WARNING**

### **Safety guidelines**

- Follow all safety codes specified in the region where the service work is to take place. Wear appropriate protective equipment such as safety glasses, protective clothing, and gloves during service work such as refrigerant filling, torque wrench use, and unit transportation. Use a quenching cloth and have a fire extinguisher available during brazing operations.
  - Failure to follow safety requirements can result in injury or death or building damage.
- Do not touch the heat exchanger fins.
  - Improper handling may result in injury.
- Never substitute parts or components from other manufacturers when repairing or replacing components in the PAA unit. Never service or operate the PAA unit if any parts or components are damaged.



## WARNING

### Service guidelines

- Read this manual carefully and follow all warnings and cautions provided with this unit. Refer to your local building code and the latest National Electrical Code (NEC) NFPA70. In Canada, be sure to refer to the latest Canadian Electrical Code CSA C22.1. Also, follow all codes specified by your region.  
We recommend installing a CO sensor and ventilation system.
  - Failure to follow safety requirements can result in injury, death or building damage.
- When moving and reinstalling the PAA unit, consult the dealer, contractor or technician with certifications required by laws and codes.
  - If the air conditioner is serviced improperly, water leakage, electric shock, or fire may result.
- Ask a dealer, contractor or technician with certifications as required by laws and codes to service the accessories.
  - Improper service by the user may result in water leakage, electric shock, or fire.
- Pay attention to the unit service location. Refrigerant is heavier than air and locations such as basements or crawl spaces where refrigerant can accumulate can become dangerous.
  - Inadequate ventilation can lead to poisoning.
- The appliance is not intended for use by persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge (including children) unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.
- *Do not add UV Lights into the PAA unit cabinet or to the attached ductwork.*
  - *UV Lights can cause degradation to plastic and insulation parts. Water leakage, electric shock, or fire may result.*
- If the gas furnace is not certified to safety standards (ANSI Z21.47/CSA2.3) by a nationally recognized third-party certification organization (AGA, UL, CSA, ETL/Intertek, etc.), or if the gas furnace does not comply with ACCA (Air Conditioning Contractors Association) Standards and Guidelines (Code), NFPA54 (National Fuel Gas Code), NFPA70 (NEC: National Electrical Code), and if the equipment is not properly installed, used, serviced, and maintained in accordance with the building code for each district (state, county, city, town, etc.), the following hazards may occur even if our equipment is properly designed, installed, and operated, and serviced.
  - If a leak sensor is not installed in the room, there is a risk of poisoning symptoms and death without noticing a toxic gas leak.
  - Gas fuel has an odor, but if you do not notice it, there is a risk that it can cause poisoning symptoms or an accident, such as a fire or explosion.
  - If the safety of gas furnace, gas supply piping, and exhaust duct worsen due to improper ventilation of the system [ventilation must be in accordance with Law, Standard or Guideline (Code)], or due to aging deterioration or the influence of the usage environment, there is a risk of poisoning symptoms due to combustion gas or igniting fuel gas and causing a fire or explosion.

**CAUTION****Risks related to PAA unit servicing**

- When servicing and relocating the PAA unit, do not charge it with a refrigerant different from the refrigerant specified on the unit.
  - If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged. Use only recommended refrigerant specified in ODU manual for system operation (ONLY R410A).
- The PAA unit is designed for indoor installation only.
- The PAA unit must be installed downstream (discharge air) side of the furnace.
- Do not alter the cabinet or braze inside the cabinet. Quench all brazed joints with water or a wet rag to avoid overheating after brazing.
  - It may affect the performance of the PAA unit.
- Do not use leak detection additive.
  - ODU and PAA unit parts may be damaged by the refrigerant/additive mixture.

**Refrigerant leak risks**

- The service (technician) shall ensure there is no refrigerant leakage according to local regulations and standards.
  - Refrigerant leakage will affect the performance of the heat pump.

**Service guidelines**

- For PAA unit piping connections, use flare connection as the equipment was designed for. Mitsubishi Electric US, Inc. is not responsible for improper brazing connection done by the service technician.
  - For pipe flaring, use an R410A flaring tool.
  - Improper brazing connections may cause damage to the PAA unit.

## 1.2. Devices that use R410A refrigerant



### CAUTION

#### Service guidelines

- Use refrigerant piping made of C12200 (Cu-DHP) phosphorus deoxidized copper as specified in the ASTM B280 Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service. Ensure that the inner and outer surfaces of the pipes are clean and free of hazardous Sulphur, oxides, dust/dirt, shaving particles, oils, moisture or any other contaminants.
  - Contaminants on the inside of the refrigerant piping may cause the refrigerant residual oil to deteriorate.
- Store the piping to be used during service indoors and keep both ends of the piping sealed until just before brazing. (Store elbows and other joints in a plastic bag.)
  - If dust, dirt, or water enters the refrigerant cycle, deterioration of the oil will result in malfunction of the compressor.
- Do not use a refrigerant other than R410A.
  - If any other refrigerant is used, the chlorine in that refrigerant may cause the refrigerant oil to deteriorate.
  - Since R410A does not contain any chlorine, gas leak detectors for conventional refrigerant will not react to it.
- Use a vacuum pump with a reverse flow check valve.
  - The vacuum pump oil may flow back into the refrigerant cycle and cause the refrigerator oil to deteriorate.
- Do not use the following tools that are used with refrigerants other than R410A:
  - Gauge manifold, charge hose, gas leak detector, reverse flow check valve, refrigerant charge base, vacuum gauge, refrigerant recovery equipment.
- Do not use a charging cylinder.
  - It may cause the refrigerant to deteriorate.
- Use liquid refrigerant to fill the system.
  - If gas refrigerant is used to seal the system, the composition of the refrigerant in the cylinder will change and performance may drop.

### 1.3. Before getting started

PAA unit is compatible with P-Series and M/Nv-Series systems and is available in the following model combinations.

**PAA unit and ODU compatibility table**

P-Series						
ODU	IDU					Comment
	PAA-A18AA1 PAA-A18BA1	PAA-A24AA1 PAA-A24BA1	PAA-A30AA1 PAA-A30BA1	PAA-A36BA1 PAA-A36CA1	PAA-A42BA1 PAA-A42CA1	
PUY-A18NKA7						No connection allowed
PUY-A24NHA7	✓	✓				
PUY-A30NHA7			✓			
PUY-A36NKA7				✓		
PUY-A42NKA7					✓	
PUZ-A18NKA7						No connection allowed
PUZ-A24NHA7	✓	✓				
PUZ-A30NHA7			✓			
PUZ-A36NKA7				✓		
PUZ-A42NKA7					✓	
PUZ-HA24NHA1		✓				
PUZ-HA30NKA			✓			
PUZ-HA36NKA				✓		
PUZ-HA42NKA1						No connection allowed

M-Series/Nv-Series						
	IDU					Comment
	PAA-A18AA1 PAA-A18BA1	PAA-A24AA1 PAA-A24BA1	PAA-A30AA1 PAA-A30BA1	PAA-A36BA1 PAA-A36CA1	PAA-A42BA1 PAA-A42CA1	
<b>ODU</b>						
MXZ-3C24NA3	✓					
MXZ-3C30NA3	✓	✓				
MXZ-4C36NA3	✓	✓				
MXZ-5C42NA3	✓	✓				
MXZ-SM36NAM	✓	✓	✓	✓		
MXZ-SM48NAM	✓	✓	✓	✓		
MXZ-SM60NAM	✓	✓	✓	✓		
MXZ-3C24NAHZ3	✓					
MXZ-3C30NAHZ3	✓	✓				
MXZ-SM36NAMHZ	✓	✓	✓	✓		
MXZ-SM42NAMHZ	✓	✓	✓	✓		
MXZ-SM48NAMHZ	✓	✓	✓	✓		

**PAA-series (Cased A-Coil) Connection**

Maximum piping length Maximum total piping with PAA connection depends on the number of PAA indoor units connected. Please refer to the table below for the appropriate total maximum piping length the system can be designed to.

Minimum piping length For branch box systems where PAA is the only unit(s) connected, the minimum piping length to each PAA unit from the outdoor unit should be 33 ft.

Model	Total Connected Indoor Capacity (kBtu/h)	Number of PAA units connected			
		No PAA Connected	1	2	3 or more
MXZ-SM36/48NAM MXZ-SM36/42/48NAMHZ	<27	492 ft (150 m)	492 ft (150 m)	(N/A, *above 27 kBtu/h)	(N/A, *above 27 kBtu/h)



Model	Total Connected Indoor Capacity (kBtu/h)	Number of PAA units connected			
		No PAA Connected	1	2	3 or more
	28-54	492 ft (150 m)	341 ft (104 m)	276 ft (84 m)	276 ft (84 m)
	>55	492 ft (150 m)	308 ft (94 m)	243 ft (74 m)	243 ft (74 m)
MXZ-SM60NAM	<27	492 ft (150 m)	492 ft (150 m)	(N/A, *above 27 kBtu/h)	(N/A, *above 27 kBtu/h)
	28-54	492 ft (150 m)	408 ft (124 m)	361 ft (110 m)	337 ft (103 m)
	>55	492 ft (150 m)	384 ft (117 m)	337 ft (103 m)	314 ft (96 m)



**NOTE**

For extended piping lengths, please refer to Diamond System Builder (DSB).



**NOTE**

The above chart is for M-Series/Nv-Series. For P-Series follow guidelines in the P-Series installation manual.

**PAA unit airflow restriction table**

		IDU				
		PAA-A18AA1 PAA-A18BA1	PAA-A24AA1 PAA-A24BA1	PAA-A30AA1 PAA-A30BA1	PAA-A36BA1 PAA-A36CA1	PAA-A42BA1 PAA-A42CA1
Airflow						
Maximum	CMM	23.0	23.5	29.0	34.0	47.0
	CFM	812	830	1024	1201	1660
Minimum	CMM	12.0	15.6	19.8	22.7	26.5
	CFM	424	551	700	800	936



## NOTE

The above airflow restriction is limited to the heat pump operation only.



## WARNING

- Ensure the gas furnace complies with ANSI-Z21.47/CSA2.3 standards by NRTL 3rd party lab such as AGA, CSA, UL, or ETL/Intertek. Mitsubishi Electric US, Inc. air conditioner/heat pump system must only be connected with ANSI-Z21.47/CSA2.3 certificated gas furnace.
  - Improper connection may result in poisonous gas, fire, explosion, electric shock or water leak.
- Do not install the PAA unit onto any OIL or DRUM type furnaces.
  - Failure to follow this warning could result in personal injury or death.
- Do NOT install the PAA unit on any furnaces or applications where supply air temperature could exceed 200 °F.
  - Failure to follow this warning could result in personal injury or death.
- The PAA unit should only be installed on a furnace with an output capacity no greater than 300% of the rated PAA unit cooling capacity.
  - Failure to follow this warning could result in personal injury or death.



## IMPORTANT

The furnace fan should be configured such that the airflow is greater than or equal to 350 CFM per ton and less than or equal to 400 CFM per ton of nominal PAA unit cooling capacity.

In downflow orientation, the furnace fan should be configured to maintain an airflow face velocity below 350 ft/min to prevent water blow-off.

**CAUTION**

- Do not use the PAA unit in special environments.
  - Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the PAA unit or damage its parts.
- Always lock the furnace disconnect switch, if present, in the open position prior to servicing the PAA unit.
- When servicing the unit in a hospital, communication station, or similar place, provide sufficient protection against electromagnetic noise.
  - The INVERTER equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the PAA unit to operate erroneously, or fail to operate. On the other hand, the PAA unit may affect such equipment by creating electromagnetic noise that disturbs medical treatment of image broadcasting.
- Make sure an auxiliary drain pan is installed to prevent occasional condensation from damaging the building.
- When the room humidity exceeds 80% or when the drain pipe is clogged, condensation may drip from the indoor unit. Perform collective drainage work together with the outdoor unit, as required.
- When the ambient dew point temperature exceeds 73° F (23° C), dew condensation may occur on the unit surface. Perform appropriate treatment, such as duct wrap insulation, to avoid dew condensation.

**NOTE**

Keep this service manual with the unit. Carefully read all instructions for the service prior to servicing the product. Make sure each step or procedure is understood and any special considerations are taken into account before starting service.

Gather all tools, hardware, and supplies needed to complete the installation. Refer to the "System introduction" and "Indoor unit accessories" sections of the PAA installation manual for items that are not included with the PAA unit. Make sure everything needed to service the product is on hand before starting. If the power source capacity is inadequate or electric work is performed improperly, electric shock and fire may result.

**WARNING**

- Failure to follow this warning could result in property damage, severe personal injury, or death: verify the furnace is properly installed according to the gas furnace service manual and local building codes.

## 1.4. Before servicing or moving the PAA unit - electrical work



### **NOTE**

Ensure the wiring is not pinched or damaged when fitting the control box cover.



## WARNING

- Be sure to ground the PAA unit and outdoor unit.
  - Do not connect the earth cable to any gas pipe, water pipe, lightning rod, or telephone earth cable. Incomplete grounding may cause a risk of electric shock. If the supply cord is damaged, it must be replaced by a dealer, contractor or technician with certifications as required by laws and codes, in order to avoid a hazard.
- Service the power cable so that tension is not applied to the cable.
  - Tension may cause the cable to break and generate heat and cause a fire.
- Install a circuit breaker as required by all applicable codes and regulations and be sure to use a qualified electrician/installer.
- Use power line cables of sufficient current carrying capacity and rating.
  - Cables that are too small may leak, generate heat, and cause a fire.
- When sizing wire and completing electrical connections during service, please follow local codes and standards.
  - Fuse or circuit breaker of a larger capacity or a steel or copper wire may result in a general unit failure or fire.
- Do not wash the PAA unit.
  - Washing the PAA unit may cause an electric shock.
- Ensure that the installation base is not damaged.
  - If damaged, the unit may fall and cause personal injury or property damage.
- Service the drain piping according to the PAA unit installation manual to ensure proper drainage. Wrap thermal insulation around the pipes to prevent condensation.
  - Improper drain piping may cause water leakage and damage to furniture and other possessions.
- Be very careful about product transportation.
  - If the product weighs more than 20 kg [44 lb], more than one person should carry the product.
  - Some products use polypropylene band (PP) bands for packaging. Do not use any PP bands for a means of transportation; it is dangerous.
  - Do not touch the heat exchanger fins. Doing so may cut your fingers.
- Safely dispose of the packing materials.
  - Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
  - Tear apart and throw away plastic packaging bags so that children will not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.
- Before installing or servicing system, always turn off main power to system. There may be more than one disconnect switch. Tag disconnect switch with a warning label.
  - Failure to follow this warning could result in personal injury or death.
- Always disconnect power to the furnace before removing the blower door.
  - Failure to disconnect power may result in electric shock or injury.
- Label all wires prior to disconnection when servicing controls. Verify proper operation after servicing.
  - Wiring errors can cause improper and dangerous operation.

## 1.5. Before starting the test run



### CAUTION

- Open the stop valves isolating the PAA unit from the outdoor unit before starting operation to avoid refrigerant pipe bursting during furnace operation.
- Turn on the power at least 12 hours before starting operation.
  - Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.
- Do not turn off the power immediately after stopping operation. Wait at least five minutes before turning off the power.
  - Turning off the power immediately may cause a water to leak.



### WARNING

- Do not touch the switches with wet fingers.
  - Touching a switch with wet fingers can cause electric shock.
- Do not touch the refrigerant pipes during and immediately after operation.
  - During and immediately after operation, the refrigerant pipes may be extremely hot or cold, depending on the condition of the refrigerant flowing through the refrigerant piping, compressor, and other refrigerant cycle parts. Your hands may suffer burns or frostbite if you touch the refrigerant pipes.
- Read the chapters from the "Selecting an installation site" chapter to the "Electrical wiring" chapter in the installation manual carefully before operating the equipment. Do not operate the furnace, PAA unit or outdoor unit with the panel or guard removed.
  - Injury may occur if you touch the rotating fan of the furnace or outdoor unit, high-temperature parts such as compressors and pipes, or high-voltage parts such as terminal blocks.
- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance. What to do you if you smell natural gas or gasoline:
  - Do not touch any electrical switch.
  - Do not use any phone in your building.
  - Immediately call your gas supplier from a neighboring location.
  - Follow the gas supplier's instructions.
  - If you cannot reach your gas supplier, call the fire department.
  - Do not try to light any appliance.
- Never use an open flame to detect refrigerant leaks. Explosive conditions may occur. Use a leak test sensor or other approved methods for leak testing. Should furnace discharge air supply overheating occur and the gas supply fails to shut off, follow the furnace installation manual to disable the gas and electric supply to the furnace.

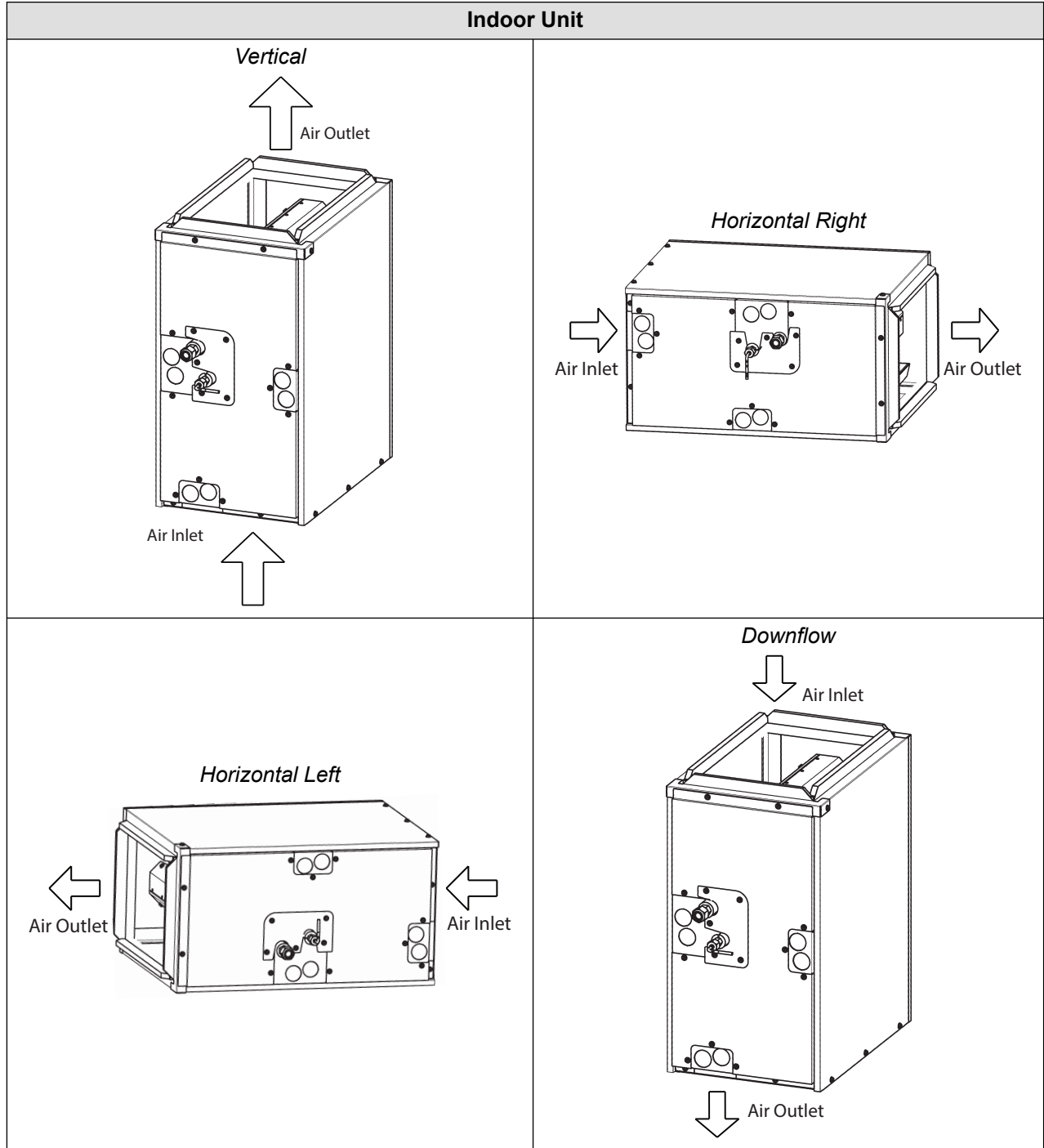
## 1.6. To dispose of the PAA unit



### **CAUTION**

To dispose of the PAA unit, consult a dealer, contractor, or technician with certifications required by laws and codes.

## 2. INSTALLATION POSITIONS AND CORRESPONDING AIRFLOW DIRECTION





### 3. SPECIFICATIONS

Item / Model			Small Cabinet		Medium Cabinet				Large Cabinet			
			PAA-A18AA1	PAA-A18BA1	PAA-A24AA1	PAA-A24BA1	PAA-A30AA1	PAA-A30BA1	PAA-A36BA1	PAA-A36CA1	PAA-A42BA1	PAA-A42CA1
Power source			208/230V, 1-phase, 60Hz (S1,S2)									
Cooling capacity	Btu/h		18,000	18,000	24,000	24,000	30,000	30,000	36,000	36,000	42,000	42,000
Heating capacity	Btu/h		19,000	19,000	26,000	26,000	32,000	32,000	38,000	38,000	46,000	46,000
Tonnage			1.5	1.5	2	2	2.5	2.5	3	3	3.5	3.5
Dimensions	Height	mm [in]	670.2 [26.4]						785.2 [31]			
	Width	mm [in]	368.3 [14.5]	445.0 [17.5]	368.3 [14.5]	445.0 [17.5]	368.3 [14.5]	445.0 [17.5]	445.0 [17.5]	534.6 [21]	445.0 [17.5]	534.6 [21]
	Depth	mm [in]	543 [21.375]									
Net weight		kg [lb]	30 [66]	34 [74]	30 [66]	35 [76]	30 [66]	35 [76]	39 [85]	46 [100]	39 [85]	46 [100]
Fan	Airflow rate*	CFM	525	525	700	700	875	875	1050	1050	1225	1225
	Internal static pressure	in. WG	0.3 (According to AHRI - 210/240, where this is the maximum allowable internal static pressure for "Coil Only" systems)									
		[Pa]	75 (According to AHRI - 210/240, where this is the maximum allowable internal static pressure for "Coil Only" systems)									

\*Target airflow rate for Y or Y1 signal.



#### NOTE

Rating conditions (cooling) indoor: 80° F [26.7° C] D.B., 67° F [19.4° C] W.B.

Rating conditions (heating) indoor: 70° F [21.1° C] D.B. Outdoor: 47° F [8.3° C] D.B., 43° F [6.1° C] W.B.

The indicated capacity is the value when one indoor unit is connected to the outdoor unit.

Specifications subject to change without notice.



#### NOTE

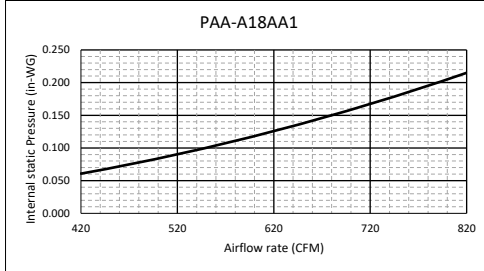
PAA units should be serviced by a dealer, contractor, or technician with proper certifications as required by laws and codes.

For outdoor units to be connected, refer to the installation manual that comes with the units.

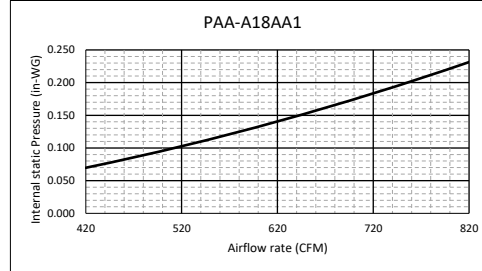
# 4. INTERNAL PRESSURE DROP

## PAA-A18AA1

- Vertical, Downflow

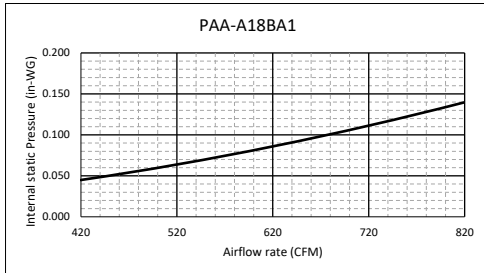


- Horizontal Right, Horizontal Left

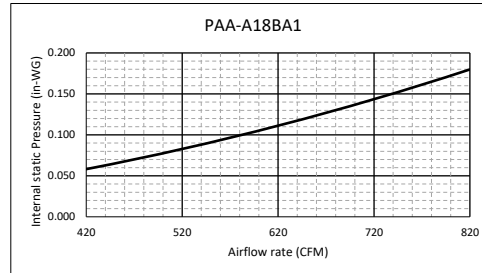


## PAA-A18BA1

- Vertical, Downflow

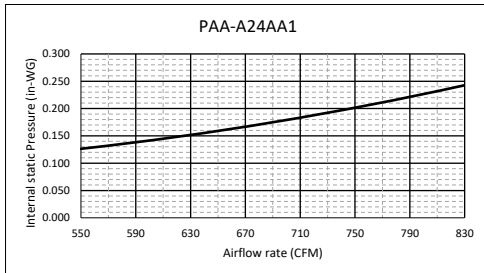


- Horizontal Right, Horizontal Left

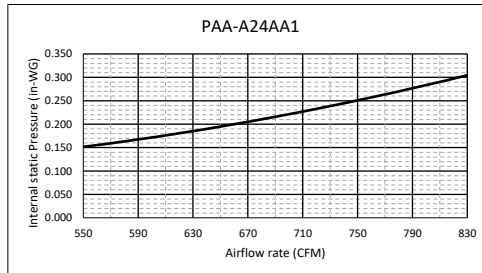


## PAA-A24AA1

- Vertical, Downflow

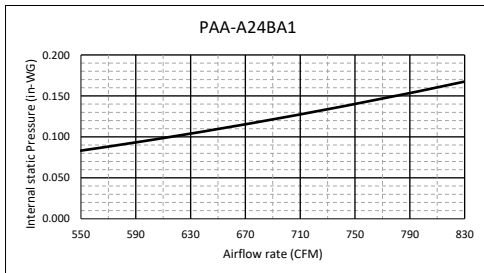


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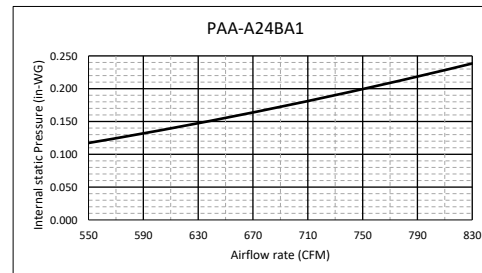


## PAA-A24BA1

- Vertical, Downflow

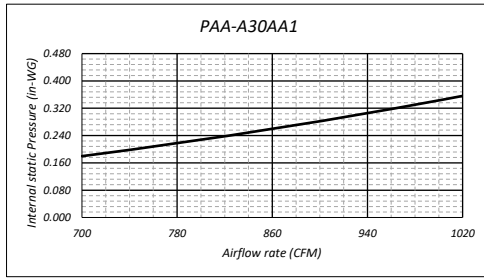


- Horizontal Right, Horizontal Left

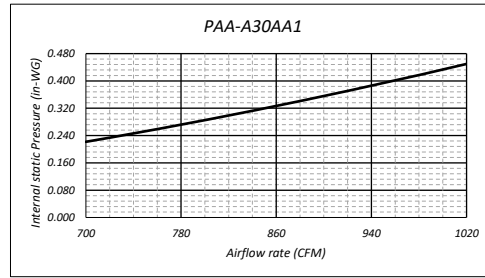


**PAA-A30AA1**

- Vertical, Downflow

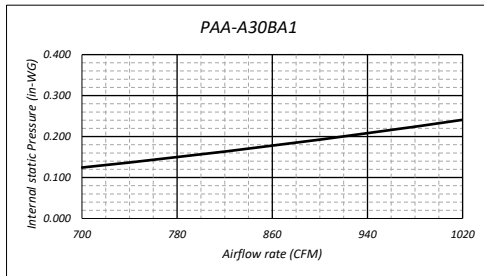


- Horizontal Right, Horizontal Left

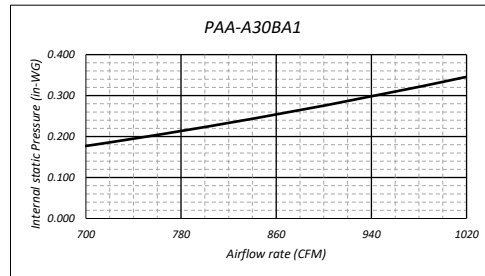


**PAA-A30BA1**

- Vertical, Downflow

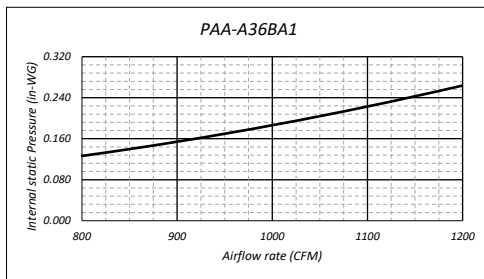


- Horizontal Right, Horizontal Left

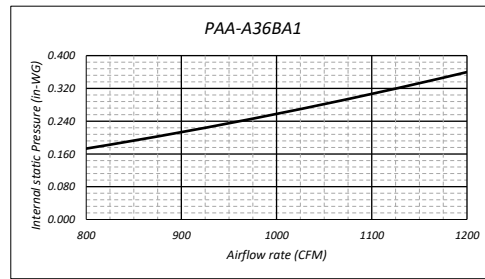


**PAA-A36BA1**

- Vertical, Downflow

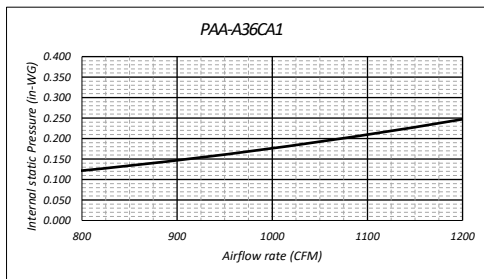


- Horizontal Right, Horizontal Left

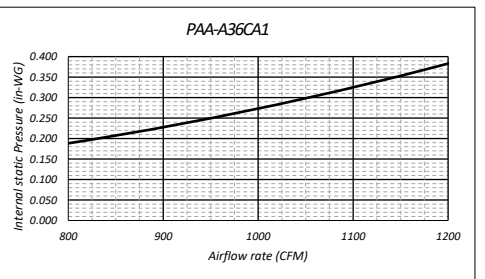


**PAA-A36CA1**

- Vertical, Downflow

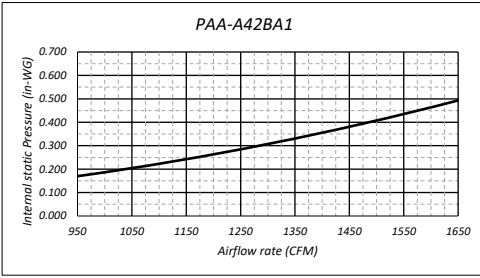


- Horizontal Right, Horizontal Left

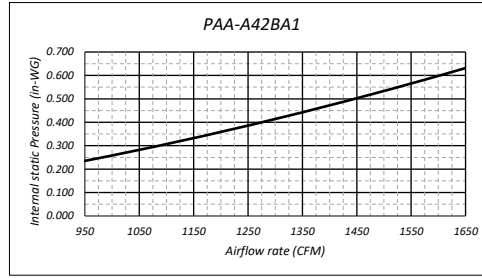


**PAA-A42BA1**

- Vertical, Downflow

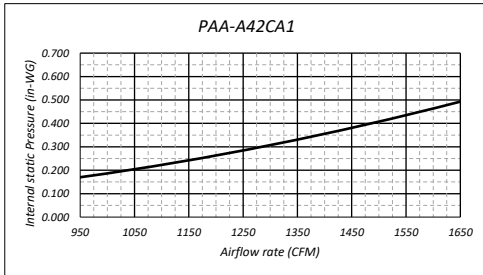


- Horizontal Right, Horizontal Left

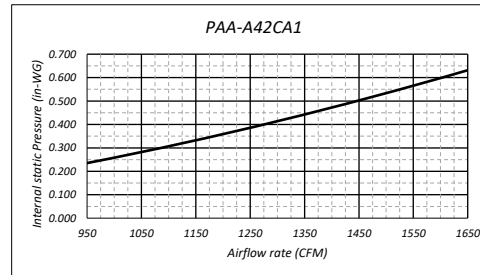


**PAA-A42CA1**

- Vertical, Downflow

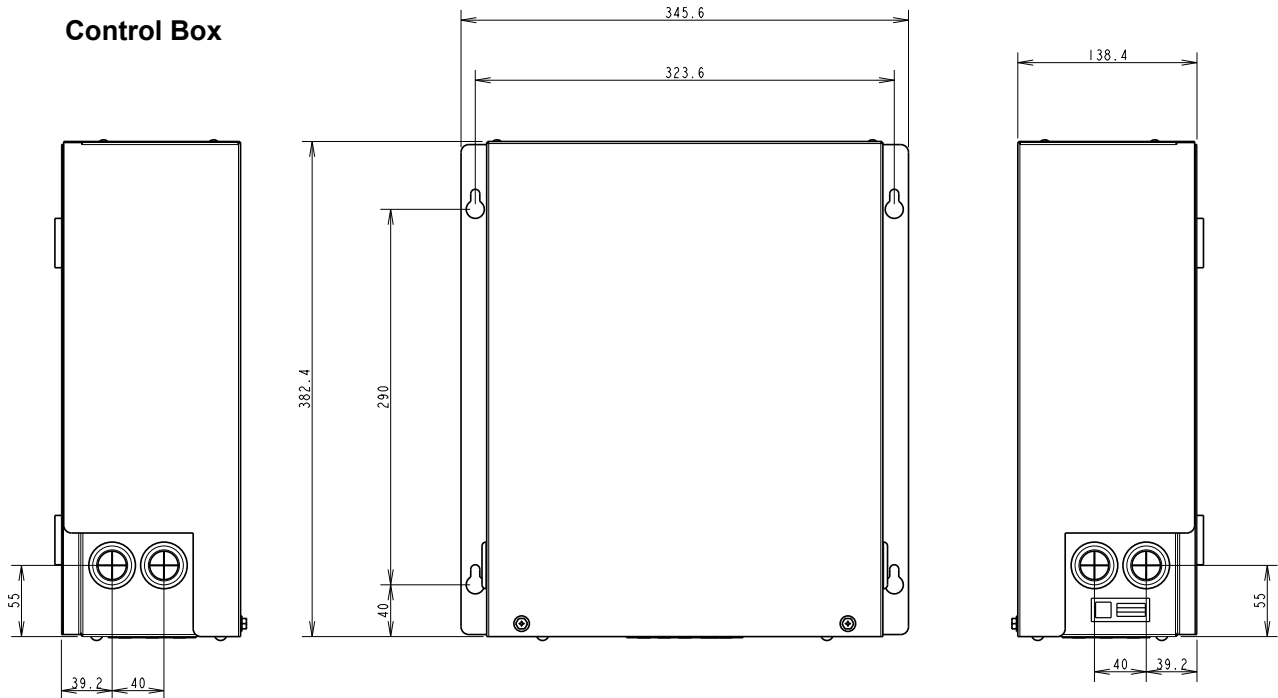


- Horizontal Right, Horizontal Left



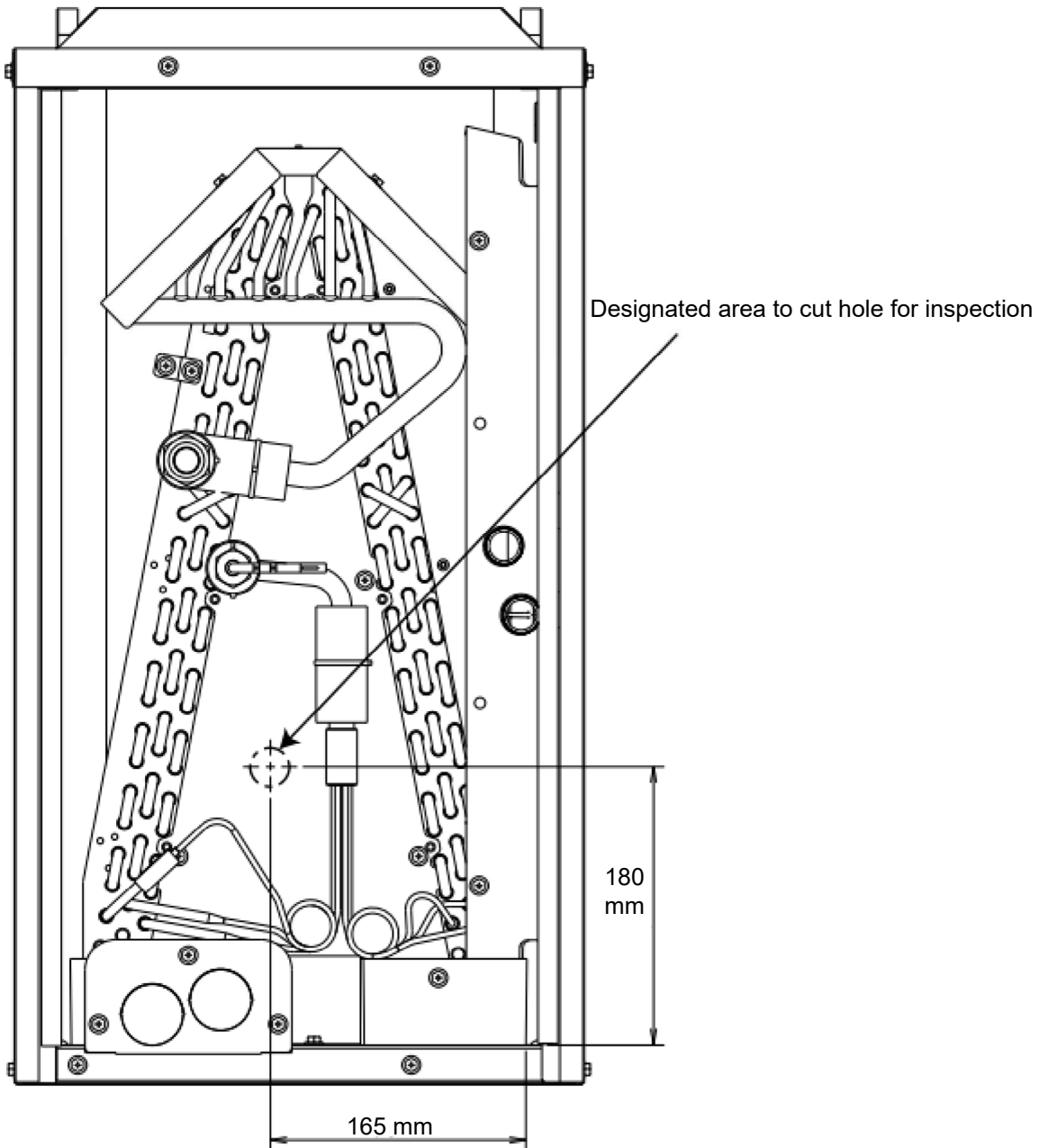


Model	A mm (inches)	B mm (inches)	C mm (inches)	D mm (inches)	E mm (inches)
PAA-A18AA1	368.3 (14-1/2)	313.1 (12-5/16)	332.7 (13-1/16)	670.2 (26-3/8)	543 (21-3/8)
PAA-A18BA1	445.0 (17-1/2)	390.0 (15-5/16)	409.6 (16-1/8)	670.2 (26-3/8)	543 (21-3/8)
PAA-A24AA1	368.3 (14-1/2)	313.1 (12-5/16)	332.7 (13-1/16)	670.2 (26-3/8)	543 (21-3/8)
PAA-A30AA1	368.3 (14-1/2)	313.1 (12-5/16)	332.7 (13-1/16)	670.2 (26-3/8)	543 (21-3/8)
PAA-A24BA1	445.0 (17-1/2)	390 (15-5/16)	409.6 (16-1/8)	670.2 (26-3/8)	543 (21-3/8)
PAA-A30BA1	445.0 (17-1/2)	390 (15-5/16)	409.6 (16-1/8)	670.2 (26-3/8)	543 (21-3/8)
PAA-A36BA1	445.0 (17-1/2)	390 (15-5/16)	409.6 (16-1/8)	785.2 (31)	543 (21-3/8)
PAA-A42BA1	445.0 (17-1/2)	390 (15-5/16)	409.6 (16-1/8)	785.2 (31)	543 (21-3/8)
PAA-A36CA1	534.6 (21)	479.4 (18-7/8)	499 (19-5/8)	785.2 (31)	543 (21-3/8)
PAA-A42CA1	534.6 (21)	479.4 (18-7/8)	499 (19-5/8)	785.2 (31)	543 (21-3/8)

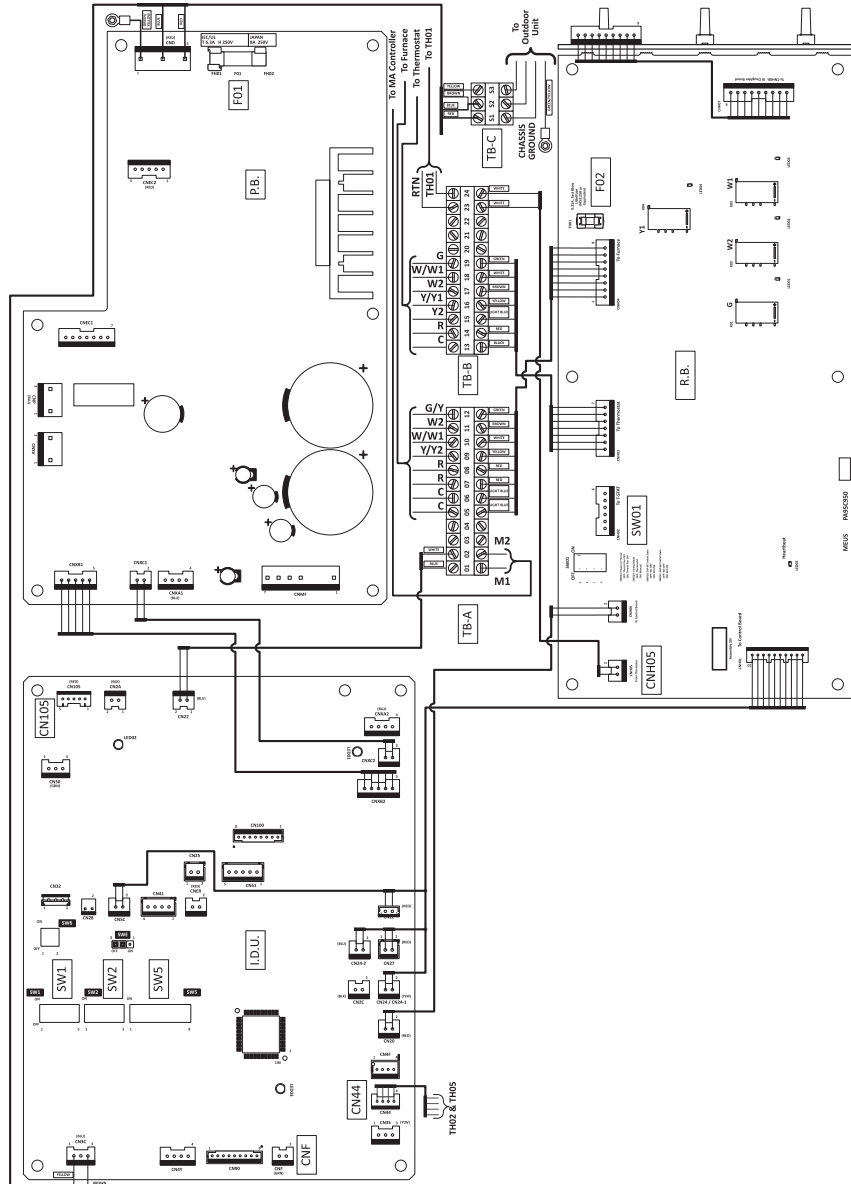


*Maintenance access to clean coil slabs:*

In order to inspect the coil slabs, a hole can be cut in only the designated area of the delta plate, as shown below. Ensure the hole is completely sealed after cleaning. The sealing material used must be able to withstand a minimum temperature of 350° F.

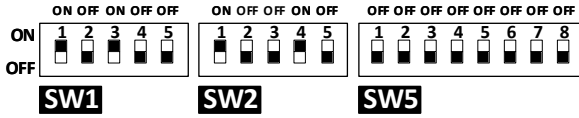
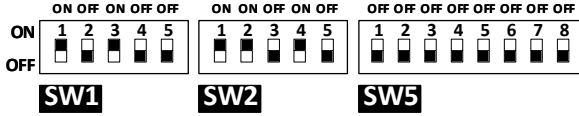
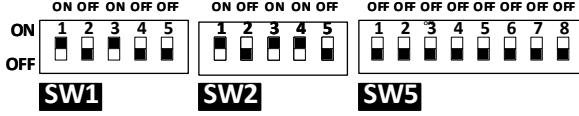

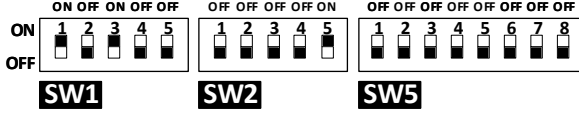


# 6. WIRING DIAGRAM



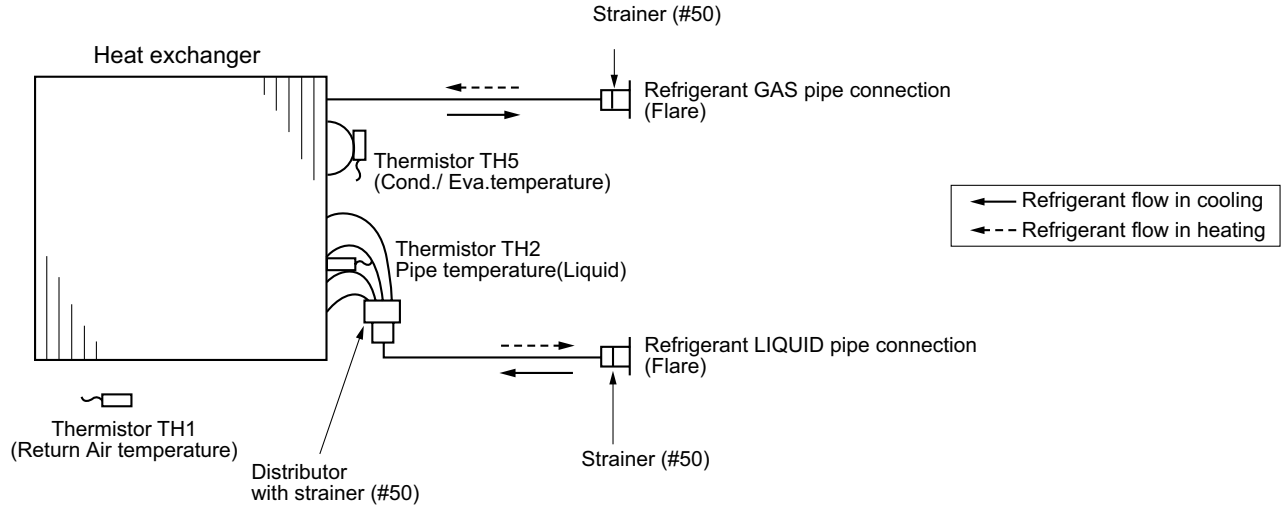
Symbol Explanation	
P.B.	Power Supply Board
I.D.U.	Indoor Unit Control Board
R.B.	Relay Board
F01	Fuse, AC250V 10A
F02	Fuse, AC250V 6.3A
CNH05	Return Air Thermistor
CN105	Interface Connector
SW01	Switch (for Model Selection)
SW02	Switch (for Capacity Selection)
SW05	Switch (for Mode Selection)
CNF	Humidifier Input (required)
CN25	Humidifier Output
CN44	TH2 Pipe Temp. thermistor/Liquid TH5 Cond./Evap Temp
TB-A	Terminal Block - A
TB-B	Terminal Block - B
TB-C	Terminal Block - C
CN4F	Float Switch
CN2A	0-10v Fan Control Input
CN24-1	Backup Heat (1st stage)
CN24-2	Backup Heat (2nd stage)
CNER	ERV/Damper Input (optional)
CN2C	ERV/Damper Output
CN2L	ME system status signal
CN32	ON/OFF Lockout Input
CN51	Error Status Output
G/Y	Fan
W/W1	First Stage Furnace
W2	Secondary Stage Furnace
Y/Y2	High Speed Fan
R	24VAC Power From Furnace
C	24VAC Return To Furnace



System	Capacity	DIP Switch Settings
<p>PAA-A18AA1 PAA-A18BA1</p>	<p>18,000 BTU</p>	
<p>PAA-A24AA1 PAA-A24BA1</p>	<p>24,000 BTU</p>	
<p>PAA-A30AA1 PAA-A30BA1</p>	<p>30,000 BTU</p>	
<p>PAA-A36BA1 PAA-A36CA1</p>	<p>36,000 BTU</p>	
<p>PAA-A42BA1 PAA-A42CA1</p>	<p>42,000 BTU</p>	

# 7. REFRIGERANT SYSTEM DIAGRAM

PAA-A18, 24, 30, 36, 42AA1/BA1/CA1



## 8. TEST MODE AND EMERGENCY MODE

Using DIP switch SW01 settings on the relay board, you can select one of two modes—Test or Emergency—to operate in.

If DIP switch SW01-4 is set to ON, the PAA unit enters Test mode. While in Test mode, the technician can use the push buttons on the control box user interface to set W1 and W2 to ON or OFF. See the "Control box user interface" image.



### WARNING

To ensure proper and safe operation of the unit, do not leave the home while the Test mode is running. Otherwise, results such as electric shock, fire or explosion may occur.

You can configure the initial (ON or OFF) state of the Test W1 and W2 heat signals in Test mode. Setting DIP switch SW01-2 to ON turns the Test W1 signal ON immediately once the furnace is powered on. Otherwise, the Test W1 signal will be OFF.

Setting DIP switch SW01-3 to ON turns the Test W2 signal ON immediately once the furnace is powered on. Otherwise, the Test W2 signal will be OFF.

#### Steps to check the furnace operation in Test mode:

**Step 1:** Turn the power to the system off.

**Step 2:** Wait for 3 minutes; this ensures that the unit is completely powered down.

**Step 3:** Set SW01-4 to ON for Test mode.

**Step 4:** Turn the furnace breaker ON. Ensure that the outdoor unit breaker is OFF. You are now in Test mode. Verify the Test mode indicator (red color) on the control box user interface is ON.

**Step 5:** Press W1 ON on the control box user interface to turn on the first stage of furnace heat. Verify that the furnace fan turns on along with furnace heat.

**Step 6:** Press W2 ON on the control box user interface to turn on the second stage of furnace heat. Verify that the furnace output increases. This is only applicable for furnaces with two stages. Single-stage furnace shows no difference.

**Step 7:** Power down the furnace.

**Step 8:** Set SW01-4 to OFF to disable Test mode.



### NOTE

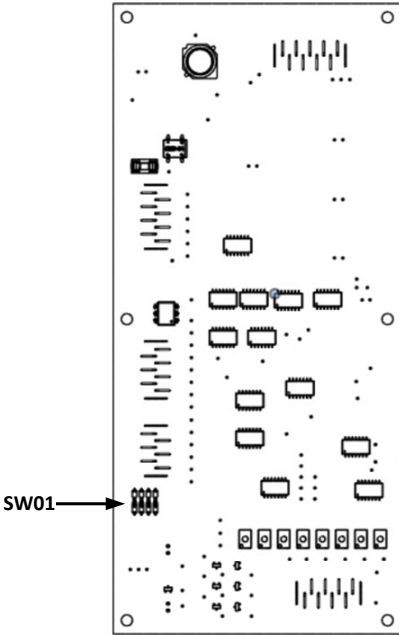
The PAA unit system enters emergency mode if power is still applied to the furnace and (a) the outdoor unit loses power or (b) there is an error state that does not allow full system control. The PAA unit remains in emergency mode until power is restored to the outdoor unit or the error is resolved.



**NOTE**

If DIP switch SW01-4 is set to OFF, the NAT connected to the PAA unit control box controls the heat applied to the furnace during an emergency mode failover.

**Relay board SW01 DIP switch settings**



<p><b>SW01-1 Power to non-adjustable thermostat</b></p> <ul style="list-style-type: none"> <li>• ON (default): Power from the furnace is supplied to the NAT.</li> <li>• OFF: Power supply from the furnace to the NAT is disconnected.</li> </ul>	<p><b>SW01-2 W1 initial state in Test mode</b></p> <ul style="list-style-type: none"> <li>• ON: W1 is initially switched on when entering Test mode.</li> <li>• OFF (default): W1 is initially switched off when entering Test mode.</li> </ul>
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**WARNING**

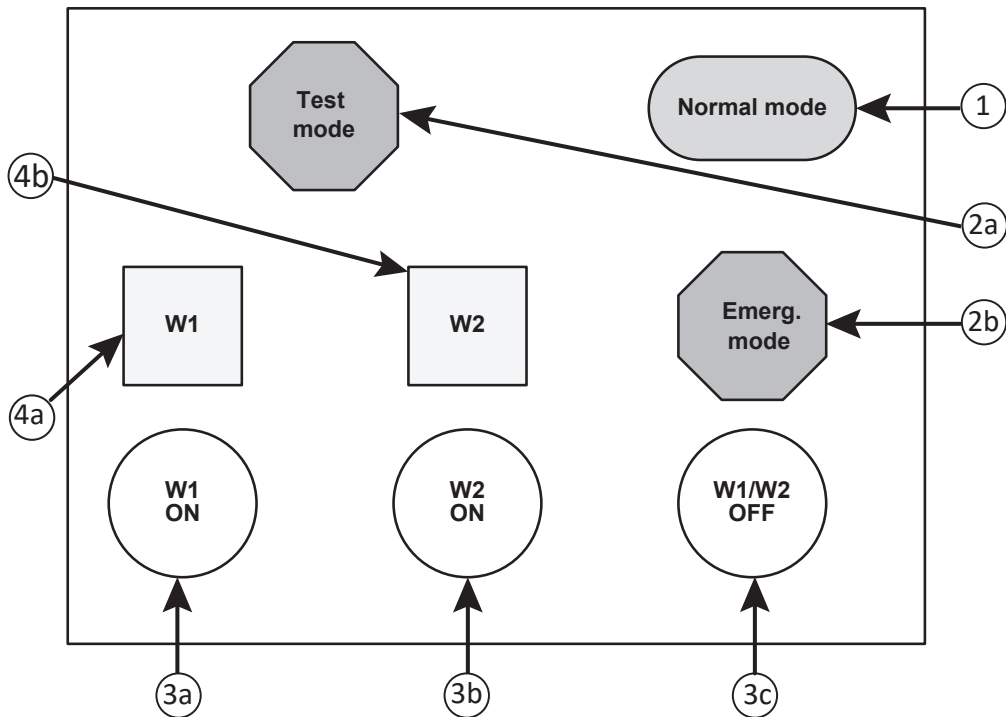
If SW01-2 and SW01-4 is set to ON, the furnace will start heating immediately upon a loss of power to the outdoor unit. Therefore, during gas furnace test operation or maintenance, be sure to power up the outdoor unit prior to powering up the furnace. Conversely, when powering down the system, the furnace should be powered down prior to powering down the outdoor unit. If operated improperly, it may result in gas leakage/poisoning, fire or explosion due to unexpected gas furnace operation.

<p><b>SW01-3 W2 initial state in Test mode</b></p> <ul style="list-style-type: none"> <li>• ON: W2 is initially switched on when entering Test mode.</li> <li>• OFF (default): W2 is initially switched off when entering Test mode.</li> </ul>	<p><b>SW01-4 Mode operation</b></p> <ul style="list-style-type: none"> <li>• ON: Test mode operation, which is controlled by push buttons on the PAA unit control box user interface.</li> <li>• OFF (default): Emergency mode operation, which is controlled by the NAT.</li> </ul>
---	--

**NOTE**

To enable W2, W1 must be ON. Otherwise, W2 will not operate.

**Control box user interface**



1. Normal mode (indicator color: green). When illuminated, it means that the system is functioning normally.

2a. Test mode (indicator color: red) - Allows the technician to operate W1/W2 using front panel push buttons mentioned below.

2b. Emergency mode (indicator color: red). If illuminated, it means that the system is in error mode.

3a. W1 ON

Test mode push button (not illuminated, button color: white).

3b. W2 ON

Test mode push button (not illuminated, button color: white).

3c. W1 and W2 OFF

Test mode push button (not illuminated, button color: white).

4a. First stage heat (emergency mode) (indicator color: amber).

4b. Second stage heat (emergency mode) (indicator color: amber).



**IMPORTANT**

**Be sure to change back to Normal mode operation after Test mode operational checks are completed!**



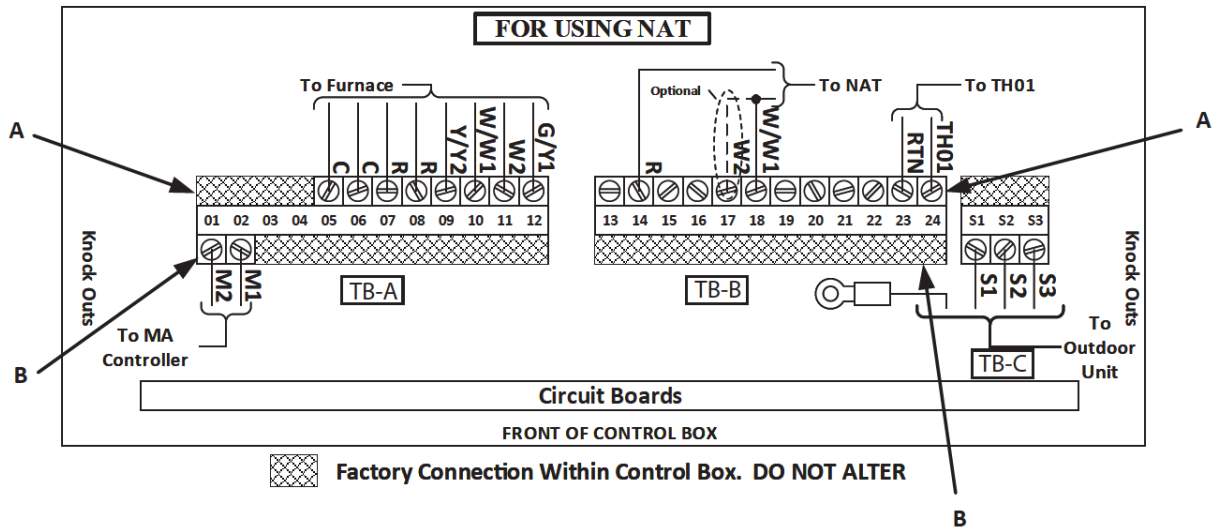
**NOTE**

- The Test and the Emergency modes cannot occur at the same time.
- To enable W2, W1 must be ON.

The non-adjustable thermostat (NAT), a construction-style thermostat included in the accessories bag, should be used as the emergency thermostat.

Install the NAT in the return air duct next to the TH1 thermistor and connect the NAT between R and W1 on the control box. To enable both W1 and W2 to come on when the emergency thermostat calls for heat, connect the W1 and W2 together to one side of the NAT and R to its other side.

**Non-adjustable (emergency) thermostat connection**



## 9. HUMIDIFIER CONTROL SPECIFICATIONS

### 9.1. Humidifier

#### Humidifier Control

Sequence of operation:

1. The humidistat closes CNF.
2. The furnace blower turns on.
3. CN25 provides 12 VDC to turn on the humidifier (do not exceed 1 watt draw per relay).
4. When the humidistat opens CNF, the furnace blower continues to run for 30 seconds to clear the ductwork of moist air.
5. If defrost starts during humidifier operation, CN25 de-energizes.

Humidistat:

- Non-voltage a-contact input
- Contact rating voltage  $\geq 15$  VDC
- Contact Rating Current  $\geq 0.1$  A
- Minimum Applicable Load  $\leq 1$  mA at DC

Mode no.	Setting no.	Settings
13	1	Humidifier not supported (CN25 output is ON if CNF input has 12 VDC applied or if there is a relevant "CN25 peripheral ON" IT protocol request via CN105, regardless of mode or settings)
	2	Humidifier supported
16 (applies if Mode no. 13 Setting no. = 2)	1	See Mode 16 table below.
	2	See Mode 16 table below.



Mode no. 16	CNF Input (humidistat)	Condition (No Defrost/No Error)	CN25 Output	Furnace Blower
1 <sup>1</sup>	OFF	Heat operation & Thermo OFF	OFF	OFF <sup>2</sup>
		Heat operation & Thermo ON		
	ON	Heat operation & Thermo OFF	OFF	OFF <sup>2</sup>
		Heat operation & Thermo ON	ON	ON <sup>2</sup>
2	OFF	Heat operation & Thermo OFF	OFF	OFF <sup>2</sup>
		Heat operation & Thermo ON		
	ON	Heat operation & Thermo OFF	ON	ON <sup>2</sup>
		Heat operation & Thermo ON		

<sup>1</sup> Factory setting

<sup>2</sup> The G/Y1 signal to the furnace is energized to turn on the furnace blower. If kumo cloud<sup>®</sup> app is used and configured to operate a second stage blower speed, the Y/Y2 signal is also energized.

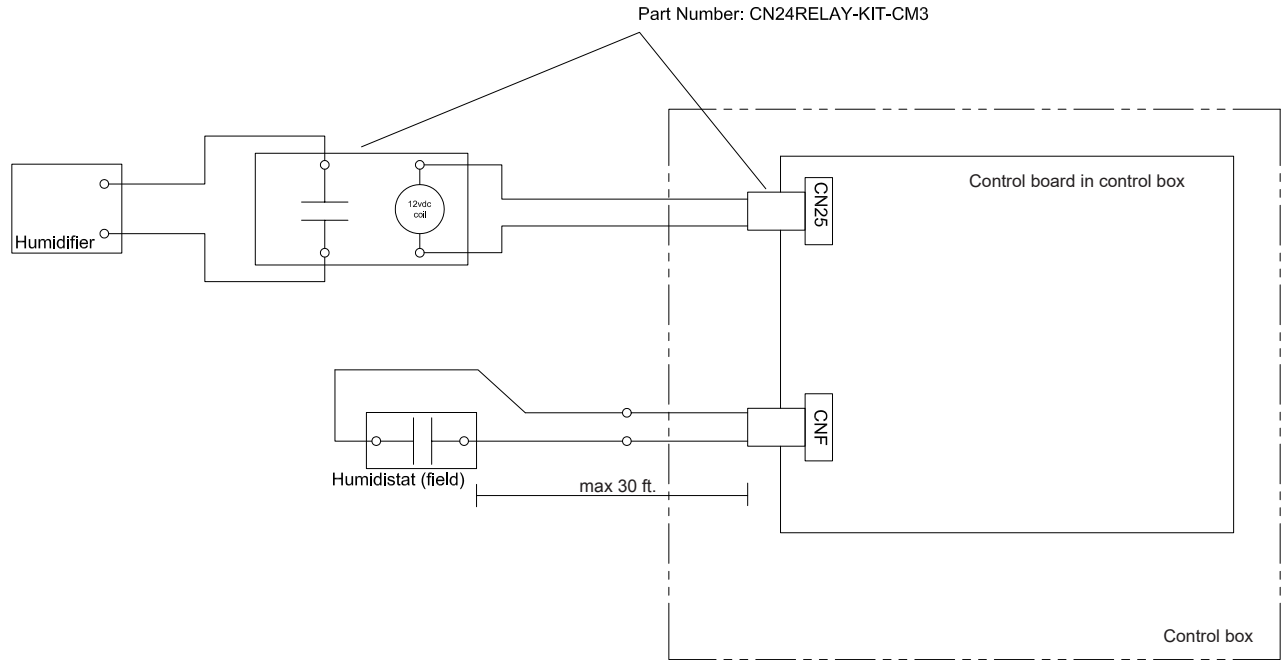


**NOTE**

- Humidifier output will only run when in heating mode.
- Mode 25 set to 1 = furnace fan on, when thermo OFF. Mode 25 set to 2 = furnace fan off, when thermo OFF.

## 9.2. Installation

A basic connection method is shown below.



## 10. ERV (ENERGY RECOVERY VENTILATION) CONTROL

### 10.1. Energy recovery ventilation (ERV)

#### ERV Switch

- Non-Voltage a-contact input
- Contact rating voltage  $\geq 15$  VDC
- Contact rating current  $\geq 0.1$  A
- Minimum applicable load  $\leq 1$ mA at DC

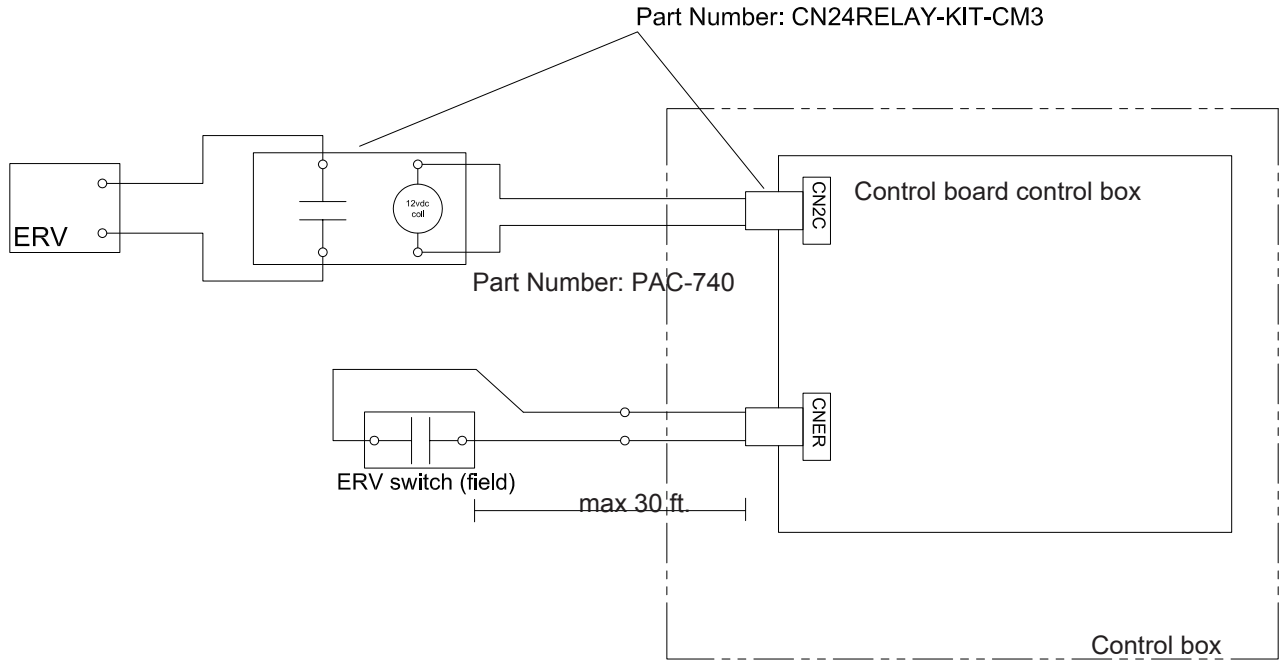
ERV output	Condition	Furnace blower (expected operation)	CN2C output (expected furnace blower output)
<b>CNER input</b>			
OFF	Cool/Heat/Fan operation	ON <sup>1 2</sup>	ON
	Defrost	STOP	OFF
	STOP	STOP	OFF
ON	Cool/Heat/Fan operation	ON <sup>1</sup>	ON
	Defrost	STOP	OFF
	STOP	ON <sup>1</sup>	ON

<sup>1</sup> The G/Y1 signal to the furnace is energized to turn on the furnace blower. If kumo cloud® app is used and configured to operate a second stage blower speed, the Y/Y2 signal is also energized.

<sup>2</sup> It is recommended to set Modes 25 and 27 to 2, in order to have the indoor fan stop running when set temperature is met. Otherwise, CN2C will energize the ERV 24/7.

## 10.2. Installation

A basic connection method is shown below.



## 10.3. HRV/ERV heating operation for MXZ system

When using an HRV/ERV, please take appropriate consideration when operating it during heating.

Model	Description
MXZ-3C24/3C30/4C36/5C42NA3 MXZ-3C24/3C30NAHZ3	When the furnace blower is moving air for HRV/ERV operation, the unit may provide warm air to the occupied space, even in Thermo-Off mode.
MXZ-SM36/42/60NAM MXZ-SM36/42/48NAMHZ	

# 11. TROUBLESHOOTING

## 11.1. Cautions on troubleshooting



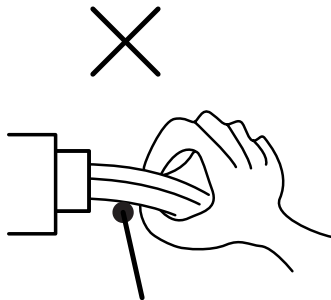
### CAUTION

(1) Before troubleshooting, check the following:

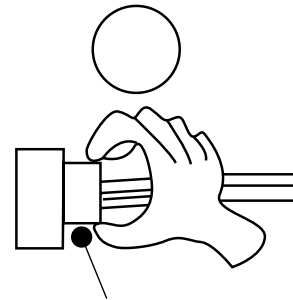
1. Check the power supply voltage.
2. Check the indoor/outdoor connecting wire for miswiring.

(2) Take care of the following during servicing.

1. Before servicing the air conditioner, be sure to turn off the remote controller first to stop the main unit, and then turn off the breaker.
2. When removing the indoor controller board, hold the edge of the board with care NOT to apply stress on the components.
3. When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



**Lead wires**



**Housing point**

## 11.2. Self-check function, Function Table

- Refer to the installation manual that comes with each remote controller for details.

[Output pattern A] Errors detected by indoor unit

Wired remote controller RF thermostat	Symptom	Remark
Check code		
P1	Intake sensor error	
P2, P9	Pipe (Liquid or 2-phase pipe) sensor error	
E6, E7	Indoor/outdoor unit communication error	
P4	Drain sensor error	
P5	Drain pump error	
P6	Freezing/Overheating safeguard operation	
EE	Communication error between indoor and outdoor units	
P8	Pipe temperature error	
E4	Remote controller signal receiving error	
-	-	
Fb	Indoor unit control system error (memory error, etc.)	
—	No corresponding	



### NOTE

Refer to outdoor service manual for errors pertaining to the outdoor unit.

## AUTO RESTART FUNCTION

### Indoor controller board

This model is equipped with the AUTO RESTART FUNCTION.

When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor controller board.

The auto restart function works after power is restored after a power failure. The unit will restart automatically approximately 4 minutes after power is restored.

Set the AUTO RESTART FUNCTION using the wireless remote controller. (Mode no.1).

## Function Table



Mode	Settings	Mode (function) No.	Setting no.	Initial setting
		Wired remote controller		
Power failure auto restart	Not available	01	1	1
	Available		2	
Indoor temperature detecting	Indoor unit operating average	02	1	1
	Set by indoor unit's remote controller		2	
	Remote controller's internal sensor		3	
LOSSNAY connectivity	Not Supported	03	1	1
	Supported (indoor unit is not equipped with outdoor air intake)		2	
	Supported (indoor unit is equipped with outdoor air intake)		3	
Power voltage	240V (230V)	04	1	1
	220V (208V)		2	
Filter sign	100 Hr	07	1	3
	2500 Hr		2	
	"No filter sign indicator"		3	
Economic Balance Point	See section 15.8.1 Economic Balance Point, of the PAA Installation Manual	08	1	3
			2	
			3	
		10	1	2
2				
Humidifier control	Heat operation & Thermo ON	16	1	1
	Heat operation		2	
Humidifier	Humidifier Not present	13	1	2
	Humidifier Present		2	
Heater Control	Heater Not Present	11	1	1
	Heater Present *1		2	
2-speed fan option	Single fan speed (High fan speed only)	23	1	1
	Dual fan speed <small>Supports LOW and HIGH speeds. PUZ/PUY AUTO mode also supported</small>		2	
Fan speed thermo off heating	Extra low	25	1	2
	Stop		2	
	RC setting		3	
Fan speed thermo off cooling	RC setting	27	1	2
	Stop		2	

### 11.3. Self-diagnosis action table

Error Code	Abnormal point and detection method	Cause	Countermeasure
P1 (5101)	<p><b>Room temperature thermistor (TH1)</b></p> <ol style="list-style-type: none"> <li>The unit is in three-minute resume prevention mode if short/open of thermistor is detected. Abnormal if the unit does not reset normally after three minutes. (The unit returns to normal operation, if it has normally reset.)</li> <li>Constantly detected during cooling, drying and heating operation Short: 90° C [194° F] or more Open: -40° C [-40° F] or less</li> </ol>	<ol style="list-style-type: none"> <li>Defective thermistor characteristics</li> <li>Contact failure of connector (CN20) on the indoor controller board (Insert failure)</li> <li>Breaking of wire or contact failure of thermistor wiring</li> <li>Defective indoor controller board</li> </ol>	<p>1-3. Check resistance value of thermistor. 0° C [32° F].....15.0kΩ 10° C [50° F].....9.6kΩ 20° C [68° F].....6.3kΩ 30° C [86° F].....4.3kΩ 40° C [104° F]...3.0kΩ</p> <p>If you put force on (draw or bend) the lead wire with measuring resistance value of thermistor breaking of wire or contact failure can be detected.</p> <p>2. Check contact failure of connector (CN20) on the indoor controller board. Refer to Test Point Diagram. Turn the power on again and check restart after inserting connector again.</p> <p>4. Check room temperature display on remote controller. Replace indoor controller board if there is abnormal difference with actual room temperature.</p> <p>Turn the power off, and on again to operate after check.</p>
P2 (5102)	<p><b>Pipe temperature thermistor/Liquid (TH2)</b></p> <ol style="list-style-type: none"> <li>The unit is in three-minute resume prevention mode if short/open of thermistor is detected. Abnormal if the unit does not reset normally after three minutes. (The unit returns to normal operation, if it has normally reset.)</li> <li>Constantly detected during cooling, drying, and heating (except defrosting) operation. Short: 90° C [194° F] or more Open: -40° C [-40° F] or less</li> </ol>	<ol style="list-style-type: none"> <li>Defective thermistor characteristics</li> <li>Contact failure of connector (CN44) on the indoor controller board (Insert failure)</li> <li>Breaking of wire or contact failure of thermistor wiring</li> <li>Defective refrigerant circuit is causing thermistor temperature of 90° C [194° F] or more or -40° C [-40° F] or less.</li> <li>Defective indoor controller board.</li> </ol>	<p>1-3. Check resistance value of thermistor. For characteristics, refer to (P1) above.</p> <p>2. Check contact failure of connector (CN44) on the indoor controller board. Refer to Test Point Diagram. Turn the power on again and check restart after inserting connector again.</p> <p>4. Check pipe &lt;liquid&gt; temperature with remote controller in test run mode. If pipe&lt;liquid&gt; temperature is extremely low (in cooling mode) or high (in heating mode), refrigerant circuit may have defective.</p> <p>5. Check pipe &lt;liquid&gt; temperature with remote controller in test run mode. If there is extreme difference with actual pipe &lt;liquid&gt; temperature, replace indoor controller board. Turn the power off, and on again to operate after check.</p>
P4 (2502)	<p>Contact failure of drain float switch (CN4F)</p> <ol style="list-style-type: none"> <li>Extract when the connector of drain float switch is disconnected. (3 and 4 of connector CN4F is not short-circuited.)</li> <li>Constantly detected during operation.</li> </ol>	<ol style="list-style-type: none"> <li>Contact failure of connector (Insert failure)</li> <li>Defective indoor controller board</li> </ol>	<ol style="list-style-type: none"> <li>Check contact failure of float switch connector. Turn the power on again and check after inserting connector again.</li> <li>Operate with connector (CN4F) short-circuited. Refer Test Point Diagram. Replace indoor controller board if abnormality reappears.</li> </ol>



Error Code	Abnormal point and detection method	Cause	Countermeasure
P6 (1501)	<p><b>Freezing/overheating protection is working</b></p> <ol style="list-style-type: none"> <li>Freezing protection (Cooling mode) The unit is in six-minute resume prevention mode if pipe &lt;liquid or condenser/evaporator&gt; temperature stays under -15° C [5° F] for three minutes after the compressor started. Abnormal if it stays under -15° C [5° F] for three minutes again within 16 minutes after six-minute resume prevention mode.</li> <li>Overheating protection (Heating mode) The units are in six-minute resume prevention mode if pipe &lt; Liquid or condenser / evaporator &gt; temperature is detected as over 70° C [158° F] after the compressor started. Abnormal if the temperature of over 70° C [158° F] is detected again within 10 minutes after six-minute resume prevention mode.</li> </ol>	<p>(Cooling or drying mode)</p> <ol style="list-style-type: none"> <li>Clogged filter (reduced air-flow)</li> <li>Short cycle of air path</li> <li>Low-load (low temperature) operation beyond the tolerance range</li> <li>Defective furnace fan motor                             <ul style="list-style-type: none"> <li>Fan motor is defective.</li> <li>Indoor controller board is defective.</li> </ul> </li> <li>Defective outdoor fan control</li> <li>Overcharge of refrigerant</li> <li>Defective refrigerant circuit (clogs)</li> </ol> <p>(Heating mode)</p> <ol style="list-style-type: none"> <li>Clogged filter (reduced air-flow)</li> <li>Short cycle of air path</li> <li>Over-load (high temperature) operation beyond the tolerance range</li> <li>Defective furnace fan motor                             <ul style="list-style-type: none"> <li>Fan motor is defective.</li> <li>Indoor controller board is defective.</li> </ul> </li> <li>Defective outdoor fan control</li> <li>Overcharge of refrigerant</li> <li>Defective refrigerant circuit (clogs)</li> <li>Bypass circuit of outdoor unit is defective</li> </ol>	<p>(Cooling or drying mode)</p> <ol style="list-style-type: none"> <li>Check clogging of the filter</li> <li>Remove shields</li> <li>Check outdoor fan motor</li> </ol> <p>5~6. Check operating condition of refrigerant circuit.</p> <p>(Heating mode)</p> <ol style="list-style-type: none"> <li>Check clogs of the filter</li> <li>Remove shields</li> <li>Check outdoor fan motor</li> </ol> <p>5~7. Check operating condition of refrigerant circuit</p>

Error Code	Abnormal point and detection method	Cause	Countermeasure
<p>P8 (1503)</p>	<p>Pipe temperature &lt;Cooling mode&gt; Detected as abnormal when the pipe temperature is not in the cooling range 3 minutes after compressor start and 6 minutes after the liquid or condenser/evaporator pipe is out of cooling range.</p> <div data-bbox="290 495 753 701" style="border: 1px solid black; padding: 5px; margin: 10px 0;">  <p><b>NOTE</b> 1) It takes at least 9 minutes. to detect. 2) Abnormality P8 is not detected in drying mode.</p> </div> <p>Cooling range: -3° C (-5.4° F) ] (TH-TH1) TH: Lower temperature between: liquid pipe temperature (TH2) and condenser/evaporator temperature (TH5) TH1: Intake temperature &lt;Heating mode&gt; When 10 seconds have passed after the compressor starts operation and the hot adjustment mode has finished, the unit is detected as abnormal when condenser/evaporator pipe temperature is not in heating range within 20 minutes.</p> <div data-bbox="290 1083 753 1318" style="border: 1px solid black; padding: 5px; margin: 10px 0;">  <p><b>NOTE</b> 3) It takes at least 27 minutes to detect abnormality. 4) It excludes the period of defrosting (Detection restarts when defrosting mode is over)</p> </div> <p>Heating range: 3° C (5.4° F) ] (TH5-TH1)</p>	<ol style="list-style-type: none"> <li>1. Slight temperature difference between indoor room temperature and pipe &lt;liquid or condenser / evaporator&gt; temperature thermistor <ul style="list-style-type: none"> <li>• Shortage of refrigerant</li> <li>• Disconnected holder of pipe &lt; liquid or condenser / evaporator &gt; thermistor</li> <li>• Defective refrigerant circuit</li> </ul> </li> <li>2. Converse connection of extension pipe (on plural units connection)</li> <li>3. Converse wiring of indoor/outdoor unit connecting wire (on plural units connection)</li> <li>4. Defective detection of indoor return air temperature and pipe &lt; condenser / evaporator &gt; temperature thermistor</li> <li>5. Stop valve is not opened completely</li> </ol>	<p>1~4. Check pipe &lt;liquid or condenser / evaporator&gt; temperature with return air temperature display on remote controller and outdoor controller circuit board.</p> <div data-bbox="1073 396 1421 548" style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>Conduct temperature check with outdoor controller circuit board after connecting 'A-Control Service Tool (PAC-SK52ST)'.</p> </div> <p>2~3. Check converse connection of extension pipe or converse wiring of indoor/outdoor unit connecting wire.</p>
<p>P9 (5105)</p>	<p>Abnormality of pipe temperature thermistor / Condenser-Evaporator (TH5)</p> <ol style="list-style-type: none"> <li>1. The unit is in three-minute resume protection mode if short/open of thermistor is detected. Abnormal if the unit does not get back to normal within three minutes. (The unit returns to normal operation, if it has normally reset.)</li> <li>2. Constantly detected during cooling, drying, and heating operation (except defrosting) Short: 90° C [194° F] or more Open: -40° C [-40° F] or less.</li> </ol>	<ol style="list-style-type: none"> <li>1. Defective thermistor characteristics</li> <li>2. Contact failure of connector (CN44) on the indoor controller board (Insert failure)</li> <li>3. Breaking of wire or contact failure of thermistor wiring</li> <li>4. Temperature of thermistor is 90° C [194° F] or more or -40° C [-40° F] or less caused by defective refrigerant circuit</li> <li>5. Defective indoor controller board</li> </ol>	<ol style="list-style-type: none"> <li>1-3. Check resistance value of thermistor. For characteristics, refer to (P1) above.</li> <li>2. Check contact failure of connector (CN44) on the indoor controller board. Refer to Test Point Diagram. Turn the power on and check restart after inserting connector again.</li> <li>4. Operate in test run mode and check pipe &lt; condenser / evaporator &gt; temperature. If pipe &lt; condenser / evaporator &gt; temperature is extremely low (in cooling mode) or high (in heating mode), refrigerant circuit may have defect.</li> <li>5. When no problems are found in 1-4 above, replace the indoor unit control board.</li> </ol>

Error Code	Abnormal point and detection method	Cause	Countermeasure
E0 (6831) or E4 (6834)	<b>Remote controller transmission error (E0) / signal receiving error (E4)</b>  1. Abnormal if main or sub remote controller can not receive normally any transmission from indoor unit of refrigerant address "0" for three minutes. (Error code: E0) 2. Abnormal if sub remote controller could not receive for any signal for two minutes. (Error code: E0) 3. Abnormal if indoor controller board can not receive normally any data from remote controller board or from other indoor controller board for three minutes. (Error code: E4) 4. Indoor controller board cannot receive any signal from remote controller for two minutes. (Error code: E4)	1. Contact failure at transmission wire of remote controller 2. All remote controllers are set as "sub" remote controller. In this case, E0 is displayed on remote controller, and E4 is displayed at LED (LED 1, LED 2) on the outdoor controller circuit board. 3. Miswiring of remote controller 4. Defective transmitting receiving circuit of remote controller 5. Defective transmitting receiving circuit of indoor controller board of refrigerant address "0" 6. Noise has entered into the transmission wire of remote controller	1. Check disconnection or looseness of indoor unit or transmission wire of remote controller. 2. Set one of the remote controllers "main". If there is no problem with the action above. 3. Check wiring of remote controller. • Total wiring length: max. 500 m (Do not use cable 53 or more) • The number of connecting indoor units: max. 16 units • The number of connecting remote controllers: max. 2 units When it is not the above-mentioned problem of 1~3 4. Diagnose remote controllers. a) When "RC OK" is displayed, Remote controllers have no problem. Turn the power off, and on again to check. If abnormality generates again, replace indoor controller board. b) When "RC NG" is displayed, Replace remote controller. c) When "RC E3" is displayed, d) When "ERC 00-06" is displayed, [ c, d ]→Noise may be causing abnormality. ] * If the unit is not normal after replacing indoor controller board in group control, indoor controller board of address "0" may be abnormal.
E3 (6201) or E5 (6203)	<b>Remote controller transmission error (E3) / signal receiving error (E5)</b>  1. Abnormal if remote controller could not find blank of transmission path for six seconds and could not transmit. (Error code: E3) 2. Remote controller receives transmitted data at the same time, compares the data, and when detecting it, judges different data to be abnormal 30 continuous times. (Error code: E3) 3. Abnormal if indoor controller board could not find blank of transmission path. (Error code: E5) 4. 2 Indoor controller board receives transmitted data at the same time, compares the data, and when detecting it, judges different data to be abnormal 30 continuous times. (Error code: E5)	1. Two remote controller are set as "main." (In case of 2 remote controllers) 2. Remote controller is connected with two indoor units or more 3. Repetition of refrigerant address 4. Defective transmitting receiving circuit of remote controller 5. Defective transmitting receiving circuit of indoor controller board 6. Noise has entered into transmission wire of remote controller.	1. Set a remote controller to main, and the other to sub 2. Remote controller is connected with only one indoor unit 3. The address changes to a separate setting 4~6. Diagnose remote controller a) When "RC OK" is displayed, remote controllers have no problem. Turn the power off, and on again to check. When becoming abnormal again, replace indoor controller board. b) When "RC NG" is displayed, replace remote controller. c) When "RC E3" or "ERC 00-66" is displayed, noise may be causing abnormality.
E6 (6840)	Indoor/outdoor unit communication error (Signal receiving error)  1. Abnormal if indoor controller board cannot receive any signal normally for six minutes after turning the power on. 2. Abnormal if indoor controller board cannot receive any signal normally for three minutes. 3. Consider the unit as abnormal under the following condition: When two or more indoor units are connected to an outdoor unit, indoor controller board cannot receive a signal for three minutes from outdoor controller circuit board, a signal which allows outdoor controller circuit board to transmit signals.	1. Contact failure, short circuit or, miswiring (converse wiring) of indoor/outdoor unit connecting wire 2. Defective transmitting receiving circuit of indoor controller board 3. Defective transmitting receiving circuit of indoor controller board 4. Noise has entered into indoor/ outdoor unit connecting wire	* Check LED display on the outdoor control circuit board. (Connect A-control service tool, PAC-SK52ST.) Refer to EA-EC item if LED displays EA-EC. 1. Check disconnection or looseness of indoor/outdoor unit connecting wire of indoor unit or outdoor unit. Check all the units in case of twin triple indoor unit system. 2~4. Turn the power off, and on again to check. If abnormality generates again, replace indoor controller board or outdoor controller circuit board. * Other indoor controller board may have defect in case of twin triple indoor unit system.

Error Code	Abnormal point and detection method	Cause	Countermeasure
E7 (6840)	<b>Indoor/outdoor unit communication error (Transmitting error)</b> Abnormal if "1" receiving is detected 30 times continuously though indoor controller board has transmitted "0".	1. Defective transmitting receiving circuit of indoor controller board 2. Noise has entered into power supply 3. Noise has entered into outdoor control wire	1~3. Turn the power off, and on again to check. If abnormality generates again, replace indoor controller board.
FB (4109)	<b>Indoor controller board</b> Abnormal if data cannot be read normally from the nonvolatile memory of the indoor controller board.	1. Defective indoor controller board	1. Replace indoor controller board.
E1 (6832) or E2 (6833)	<b>Remote controller control board</b> 1. Abnormal if data cannot be read normally from the nonvolatile memory of the remote controller control board. (Error code: E1) 2. Abnormal if the clock function of remote controller cannot be operated normally. (Error code: E2)	1. Defective remote controller	1. Replace remote controller.

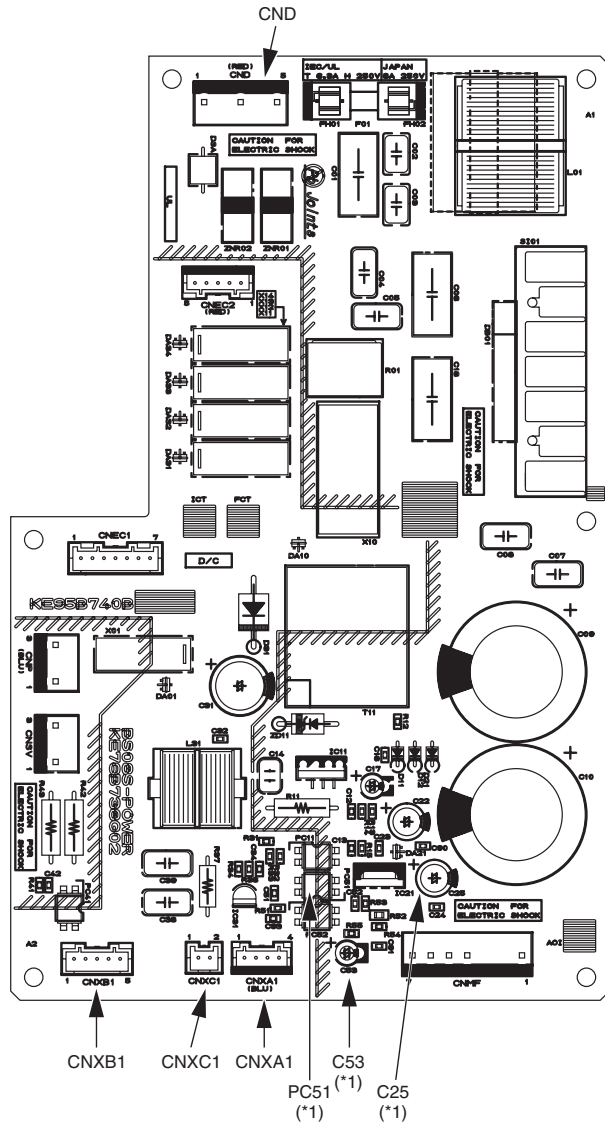
## 11.4. Troubleshooting by inferior phenomena

Phenomena	Cause	Countermeasure
<b>(1) LED 2 on indoor controller board is off.</b>	<ul style="list-style-type: none"> <li>• When LED 1 on indoor controller board is also off.</li> </ul> <ol style="list-style-type: none"> <li>1. Power supply of rated voltage is not supplied to outdoor unit</li> <li>2. Defective outdoor controller circuit board</li> <li>3. Power supply of 208~230V is not supplied to indoor unit</li> <li>4. Defective indoor controller board</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the voltage of outdoor power supply terminal block (L, N) or (L3, N).                             <ul style="list-style-type: none"> <li>• When AC 208~230V is not detected. Check the power wiring to outdoor unit and the breaker.</li> <li>• When AC 208~230V is detected.                                     <ul style="list-style-type: none"> <li>– Check 2 (below)</li> </ul> </li> </ul> </li> <li>2. Check the voltage between outdoor terminal block S1 and S2.                             <ul style="list-style-type: none"> <li>• When AC 208~230V is not detected. Check the fuse on outdoor controller circuit board. Check the wiring connection.</li> <li>• When AC 208~230V is detected.                                     <ul style="list-style-type: none"> <li>– Check 3 (below)</li> </ul> </li> </ul> </li> <li>3. Check the voltage between indoor terminal block S1 and S2.                             <ul style="list-style-type: none"> <li>• When AC 208~230V is not detected. Check indoor/outdoor unit connecting wire for miswiring.</li> <li>• When AC 208~230V is detected.                                     <ul style="list-style-type: none"> <li>– Check 4 (below)</li> </ul> </li> </ul> </li> <li>4. Check the fuse on indoor controller board. Check the wiring connection. If no problem are found, indoor controller board is defective.</li> </ol>
<b>(2) LED 2 on indoor controller board is blinking.</b>	<ul style="list-style-type: none"> <li>• When LED 1 on indoor controller board is also blinking. Connection failure of indoor/outdoor unit connecting wire.</li> <li>• When LED 1 is lit.</li> </ul> <ol style="list-style-type: none"> <li>1. Miswiring of remote controller wires Under twin triple indoor unit system, 2 or more indoor units are wired together.</li> <li>2. Refrigerant address for outdoor unit is wrong or not set. Under grouping control system, there are some units whose refrigerant address is 0.</li> <li>3. Short-cut of remote controller wires.</li> <li>4. Defective remote controller.</li> </ol>	<p>Check indoor/outdoor unit connecting wire for connection failure.</p> <ol style="list-style-type: none"> <li>1. Check the connection of remote controller wires in case of twin or triple indoor unit system. When 2 or more indoor units are wired in one refrigerant system, connect remote controller wires to one of those units.</li> <li>2. Check the setting of refrigerant address in case of grouping control system. If there are some units whose refrigerant addresses are 0 in one group, set one of the units to 0 using SW1 (3-6) on outdoor controller circuit board.</li> <li>3~4. Remove remote controller wires and check LED 2 on indoor controller board.                             <ul style="list-style-type: none"> <li>• When LED 2 is blinking, check the short-cut of remote controller wires.</li> <li>• When LED 2 is lit, connect remote controller wires again and: if LED 2 is blinking, remote controller is defective; if LED 2 is lit, connection failure of remote controller terminal block etc. has returned to normal.</li> </ul> </li> </ol>

## 11.5. Test point diagram

### 11.5.1. Power supply board

PAA-A18, 24, 30, 36, 42AA1/BA1/CA1



CND: Power supply voltage (208 - 230 VAC)

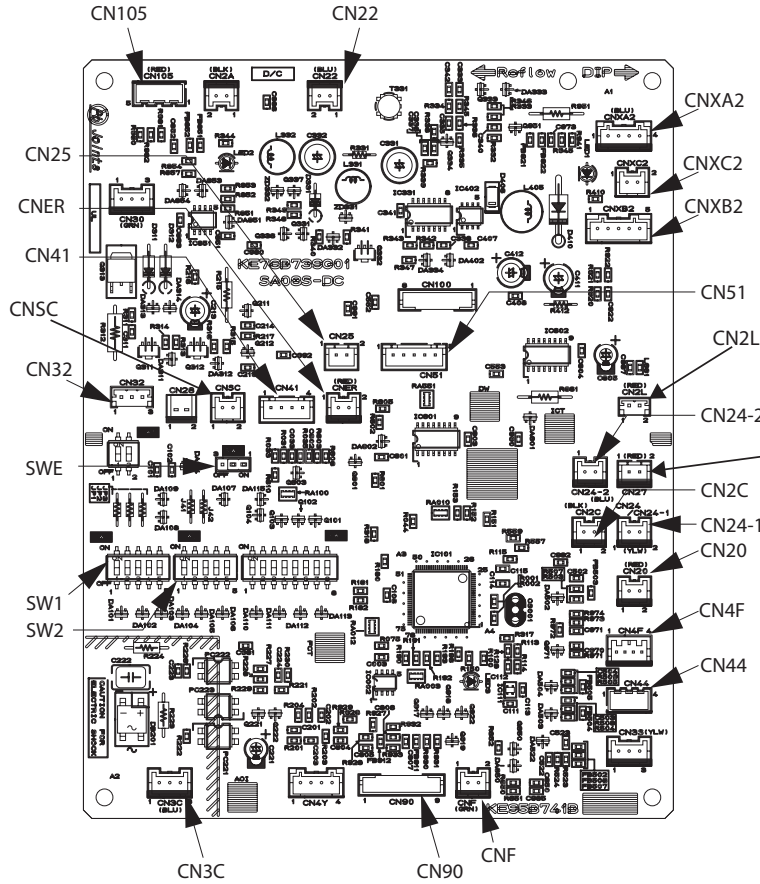
CNXA1: Connect to the indoor controller board

CNXC1: Connect to the indoor controller board

CNXC1: Connect to the indoor controller board

## 11.5.2. Indoor controller board

PAA-A18, 24, 30, 36, 42AA1/BA1/CA1



- CN24-2: W2 (Aux Heat) Command signal
- CN3C: Indoor-outdoor transmission (0 - 24 VDC)
- CN90: Wireless remote controller
- CNXA2: Connect to the indoor power board
- CNXB2: Connect to the indoor power board
- CN51: Error Status Output
- CN2L: ME System status signal
- CNXC2: Connect to the indoor power board
- CNER: ERV/ damper input (optional)
- CN2C: ERV/damper output
- CN25: Humidifier output
- CNF: Humidifier input (required)
- CN2L: ME System status signal
- CN27: G (fan) Command signal
- CNSC: YY2 (High Speed Fan) Command signal

- SWE: Emergency operation
- SW01: Model selection
- SW02: Capacity setting
- CN105: Interface Connector
- CN32: ON/OFF Lockout Input
- CN22: For MA remote controller cable connection (10-13 VDC)
- CN51: Error Status Output
- CN41: JAMA standard HA terminal
- CN44: TH02 Pipe Temp. thermistor/Liquid; TH05 Cond./Evap Temp
- CN4F: Float sensor
- CN20: Thermistor (Inlet temperature)
- CN24-1: W/W1 (Heat) Command signal

## 11.6. Trouble criterion of main parts

PAA-A18, 24, 30, 36, 42AA1/BA1/CA1

Part name	Check method and criterion
Return Air temperature thermistor (TH1) See note below.	Measure the resistance with a tester. (Part temperature 10° C (50° F) ~ 30° C (86° F)) Refer to section 11.7 Thermistor chart 1 and 2 for thermistor values.
Pipe temperature thermistor/liquid (TH2)	
Condenser/evaporator temperature thermistor (TH5)	



### NOTE

If the PAA unit will be or is installed into an unconditioned space, note that air temperatures in the ductwork (as measured by the return air thermistor) may vary from the space temperature. Where this variance is large, it can affect the system's ability to cool the occupied space down to the minimum cooling setpoint or heat up to the maximum heating setpoint. The following measures can be applied to mitigate the effect of the temperature variance:

- Insulate the ductwork.
- Use a remote controller option with sensing capability.
- Place the return air thermistor as far away from the furnace as possible, avoiding bypass ducts, but taking care to ensure that all return duct branches remain upstream of the thermistor.
- Ensure that the provided mounting bracket is used to position the return air thermistor well within the air stream.
- Adjust fan in thermal off settings to maintain airflow through the cabinet.
- Install PAC-USSEN00(1|2)FM-1 as the return air sensor, placed into the conditioned space.
- Use kumo cloud in conjunction with the PAC-USWHS003TH-1 wireless temperature and humidity sensor.



## 11.7. Thermistor

Chart 1: TH1 Thermistor

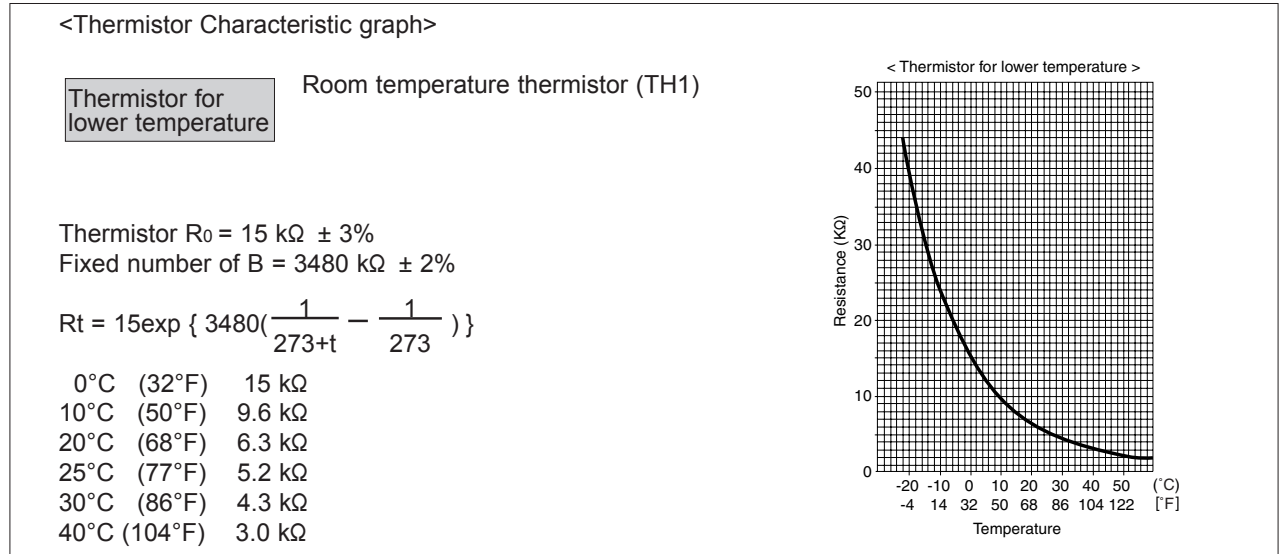
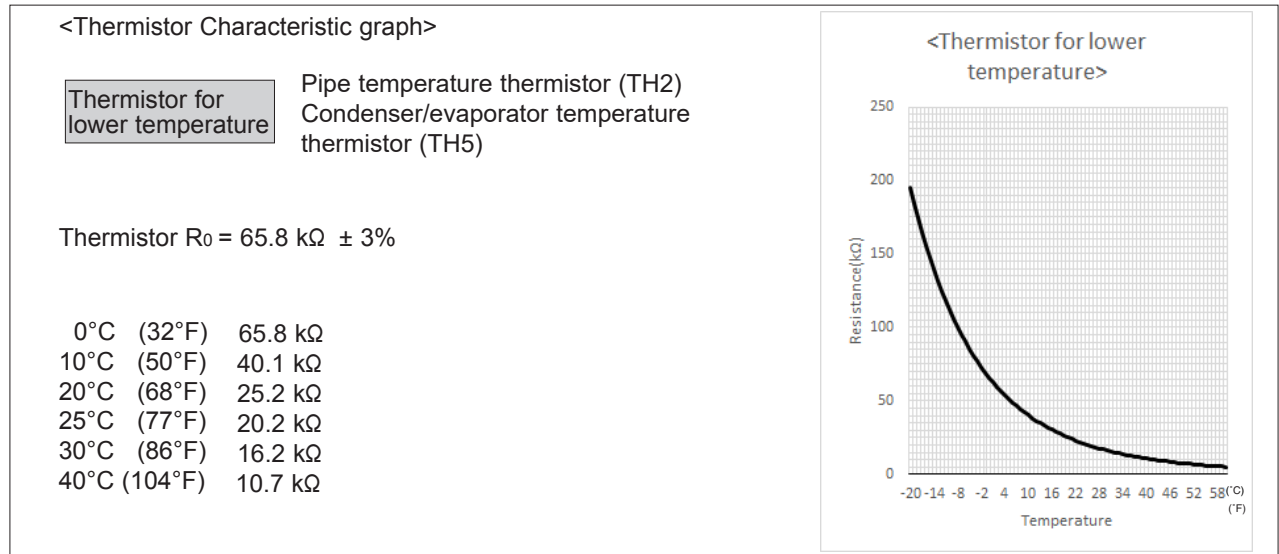


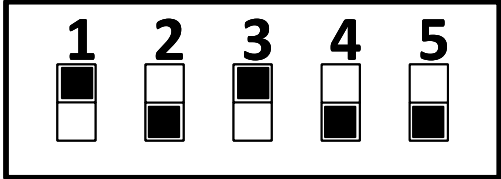
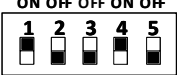
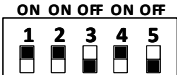

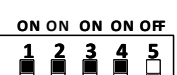
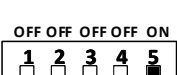
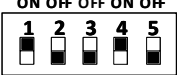
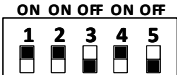

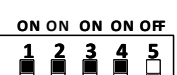
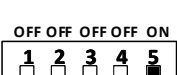
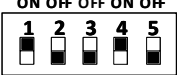
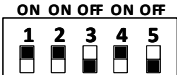

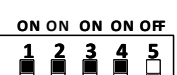
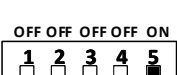
Chart 2: TH2 and TH5 Thermistor



## 12. FUNCTIONS OF DIP SWITCH AND JUMPER WIRE

Each function is controlled by the DIP switch and the jumper wire on control PC board. SW1 and SW2 are equipped only for service parts.

Model setting and capacity setting are memorized in the nonvolatile memory of the control PC board of the unit.

Jumper wire	Functions	Setting by the dip switch and jumper wire	Remarks										
SW1	Model settings	For service board ON OFF ON OFF OFF 											
SW2	Capacity settings	<table border="0"> <tr> <td><b>PAA-A18AA1</b> <b>PAA-A18BA1</b></td> <td>                     ON OFF OFF ON OFF   </td> </tr> <tr> <td><b>PAA-A24AA1</b> <b>PAA-A24BA1</b></td> <td>                     ON ON OFF ON OFF   </td> </tr> <tr> <td><b>PAA-A30AA1</b> <b>PAA-A30BA1</b></td> <td>                     ON OFF ON ON OFF   </td> </tr> <tr> <td><b>PAA-A36BA1</b> <b>PAA-A36CA1</b></td> <td>                     ON ON ON ON OFF   </td> </tr> <tr> <td><b>PAA-A42BA1</b> <b>PAA-A42CA1</b></td> <td>                     OFF OFF OFF OFF ON   </td> </tr> </table>	<b>PAA-A18AA1</b> <b>PAA-A18BA1</b>	ON OFF OFF ON OFF 	<b>PAA-A24AA1</b> <b>PAA-A24BA1</b>	ON ON OFF ON OFF 	<b>PAA-A30AA1</b> <b>PAA-A30BA1</b>	ON OFF ON ON OFF 	<b>PAA-A36BA1</b> <b>PAA-A36CA1</b>	ON ON ON ON OFF 	<b>PAA-A42BA1</b> <b>PAA-A42CA1</b>	OFF OFF OFF OFF ON 	
<b>PAA-A18AA1</b> <b>PAA-A18BA1</b>	ON OFF OFF ON OFF 												
<b>PAA-A24AA1</b> <b>PAA-A24BA1</b>	ON ON OFF ON OFF 												
<b>PAA-A30AA1</b> <b>PAA-A30BA1</b>	ON OFF ON ON OFF 												
<b>PAA-A36BA1</b> <b>PAA-A36CA1</b>	ON ON ON ON OFF 												
<b>PAA-A42BA1</b> <b>PAA-A42CA1</b>	OFF OFF OFF OFF ON 												
JP1	Unit type setting	<table border="1"> <thead> <tr> <th>Model</th> <th>JP1</th> </tr> </thead> <tbody> <tr> <td>With TH5</td> <td>X</td> </tr> </tbody> </table>	Model	JP1	With TH5	X	There is no jumper (JP1) because these models have the cond./eva. temperature thermistor (TH5). X - No jumper						
Model	JP1												
With TH5	X												
JP3	Indoor controller board type setting	<table border="1"> <thead> <tr> <th>Indoor controller board type</th> <th>JP3</th> </tr> </thead> <tbody> <tr> <td>Factory shipment</td> <td>○</td> </tr> <tr> <td>Service parts</td> <td>○</td> </tr> </tbody> </table>	Indoor controller board type	JP3	Factory shipment	○	Service parts	○	There is a jumper on JP3. O - Jumper				
Indoor controller board type	JP3												
Factory shipment	○												
Service parts	○												

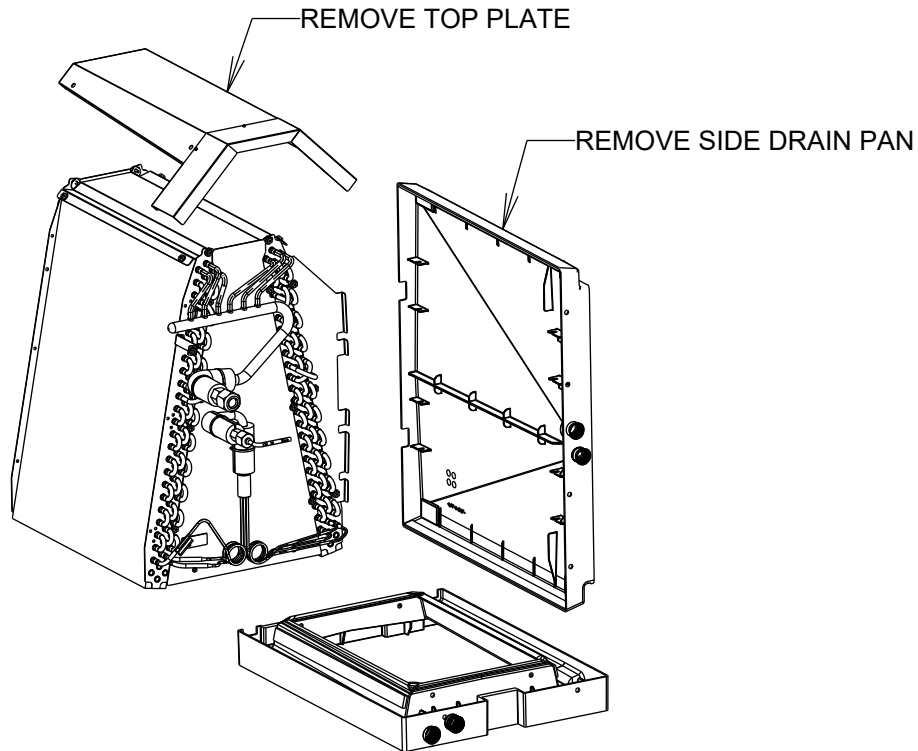
## 13. DISASSEMBLY PROCEDURE

The side drain pan and the top plate must be removed from the coil assembly for vertical configuration installation. Remove the side drain pan (as well as its support and 2 triangular pieces) and the top plate as shown in the following steps. Removal of the side drain pan and top plate increases airflow and efficiency.

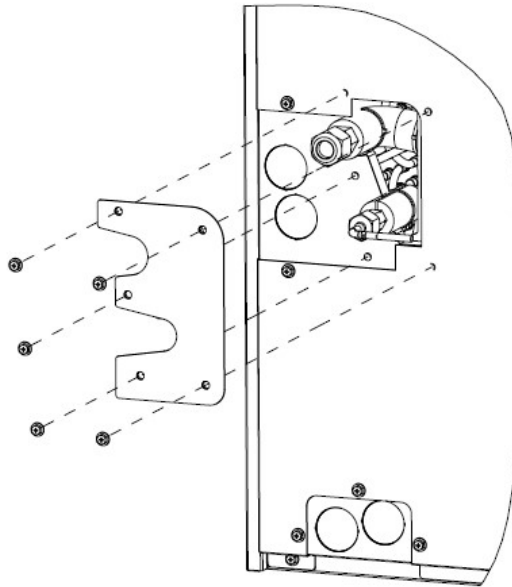
### ATTENTION!

FOR UPFLOW AND DOWNFLOW INSTALLATIONS:

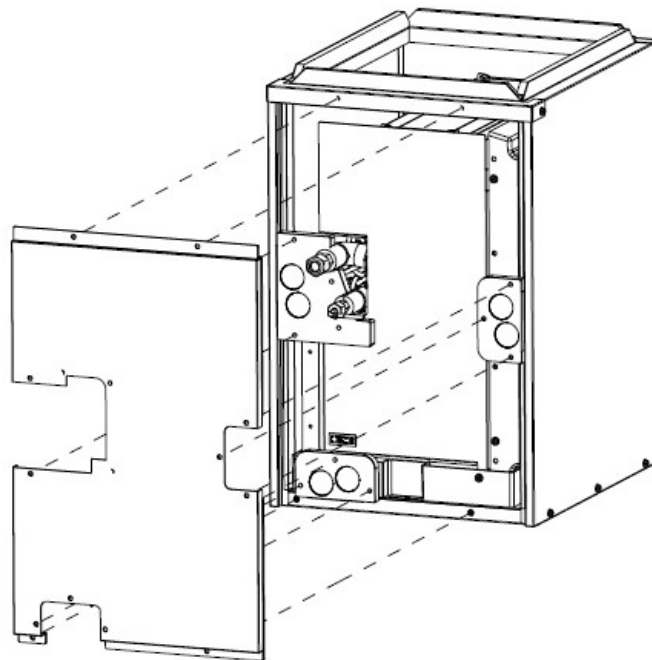
1. THE TOP PLATE MUST BE REMOVED (AS SHOWN).
2. THE SIDE DRAIN PAN MUST BE REMOVED (AS SHOWN).



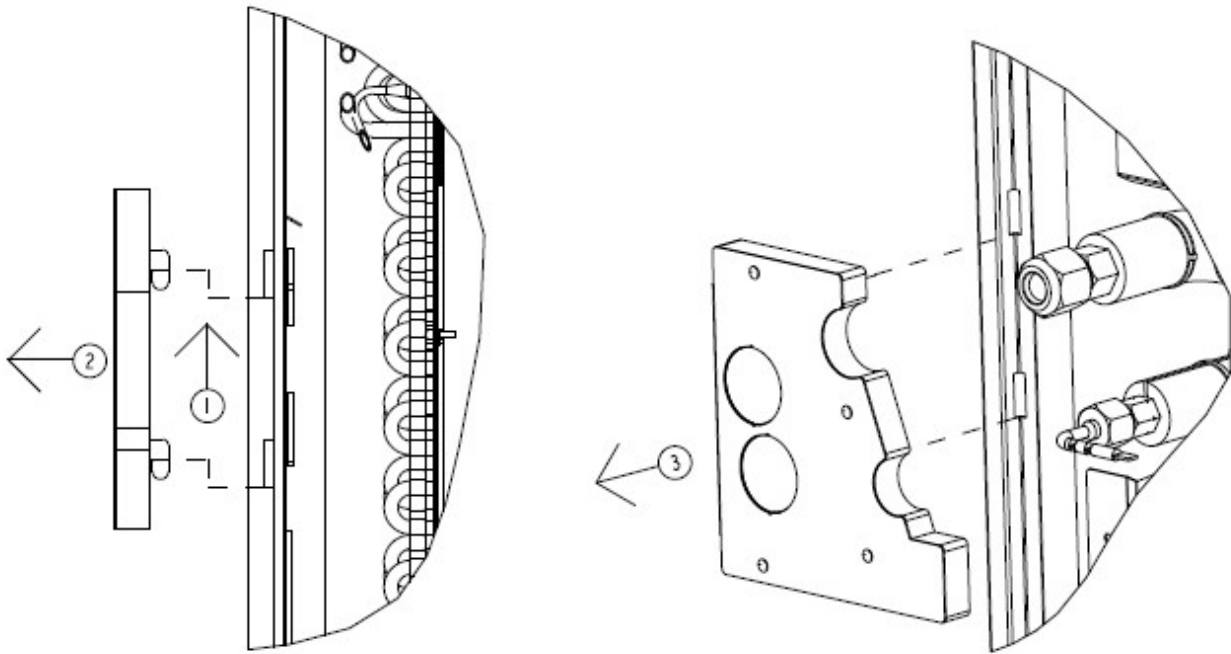
**Step 1:** Remove pipe panel which is secured by 5 screws, as displayed below:



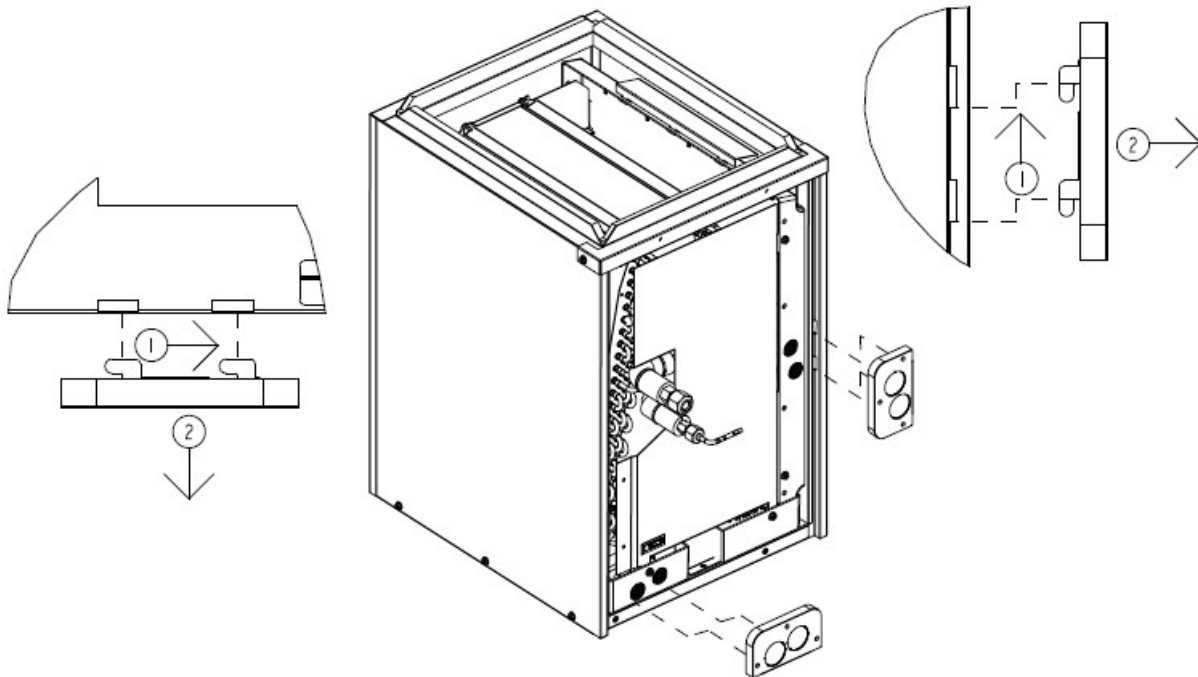
**Step 2:** Remove front panel which is secured by 12 screws. (Screws not shown.)



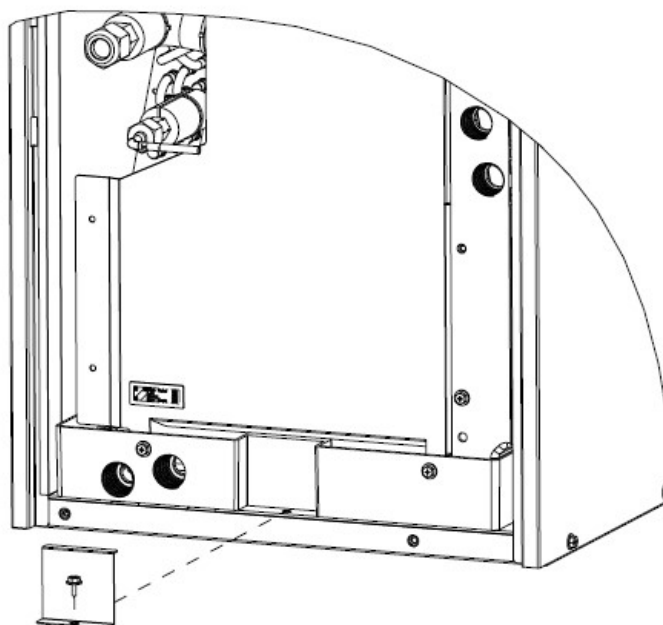
**Step 3:** Remove pipe panel (main pipe panel) which is hooked to the cabinet, by moving it in the directions indicated in the image below and then removing it from the cabinet.



**Step 4:** Remove the 2 side panels (side pipe panel assembly), which are hooked to the cabinet, by moving them in the directions indicated in the images below and removing them from the cabinet.



**Step 5:** Remove front Z-bracket, secured by a screw, which is located on the shelf attached to the drain pan.

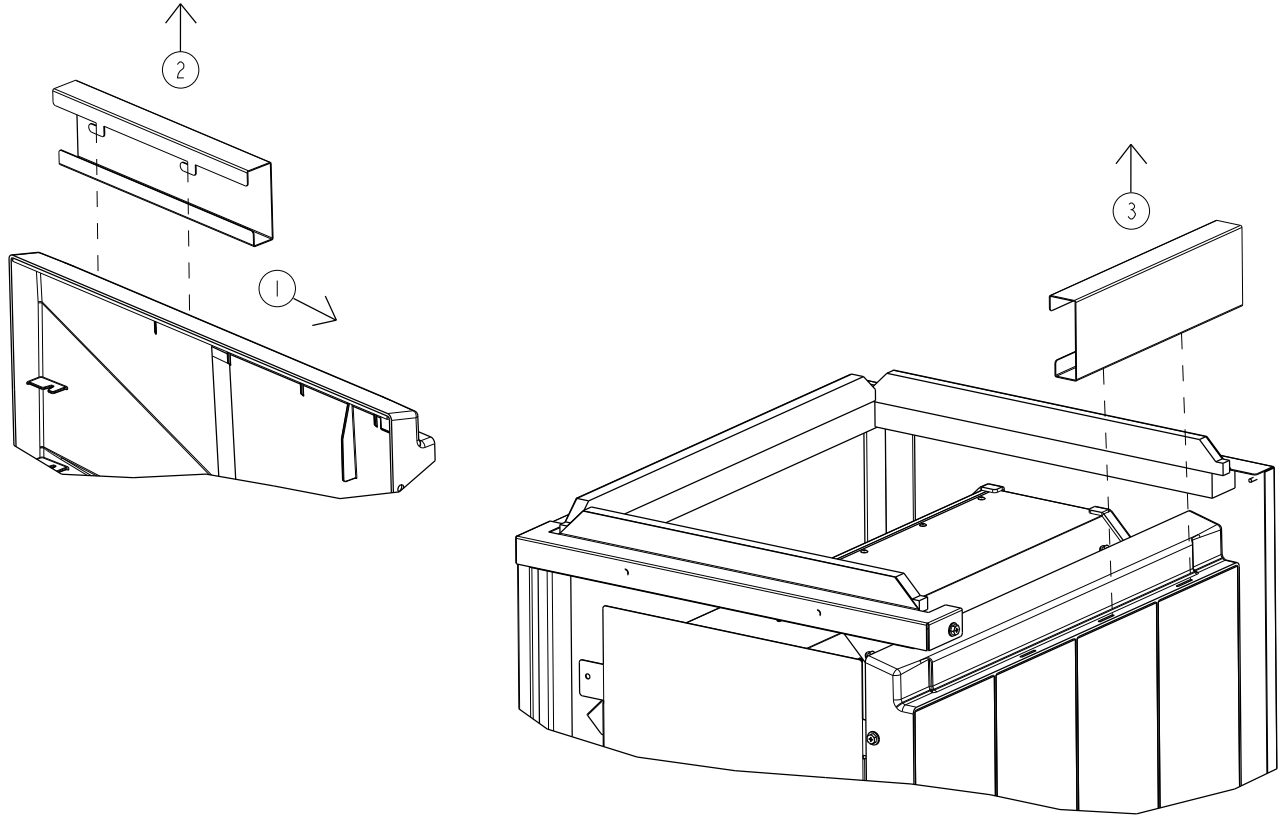


**Step 6:** Remove the side drain pan support from the side drain pan by sliding the support over and pulling it up. Retain the side drain pan support for horizontal left installation. Discard (recycle) the support for vertical /downflow installations.



#### NOTE

Side drain pan support must be removed while the heat exchanger is inside the cabinet. Some parts are not shown for clearer image.

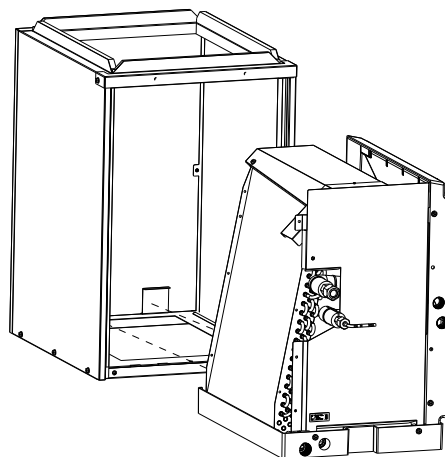


**Step 7:** Remove the heat exchanger assembly by sliding it out of the cabinet.

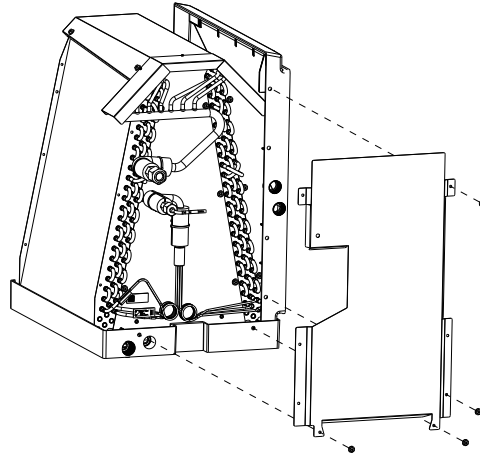


### CAUTION

- Use extreme caution when removing the heat exchanger from the cabinet as the thermistor wires are attached to the assembly.
  - Damaging these wires may cause the unit to malfunction.



**Step 8:** Remove front plate (holds the side and main drain pans), which is secured by 4 screws.

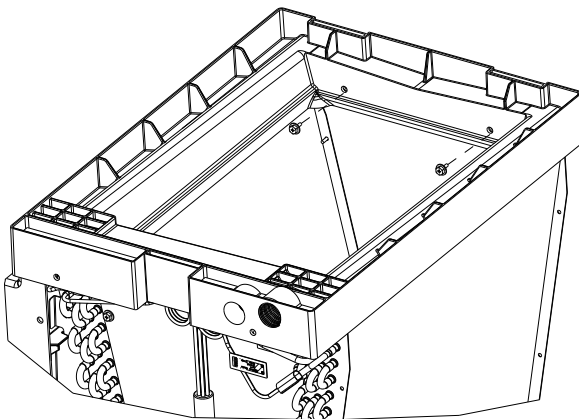


**Step 9:** Lift the heat exchanger by removing the 4 screws securing it to the drain pan.

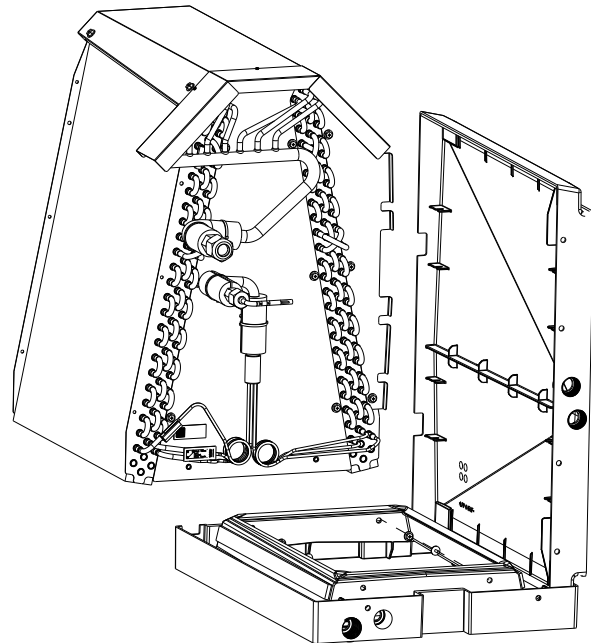


### WARNING

- Removing the heat exchanger may cause the side drain pan to fall off the main drain pan.
  - Drain pan may fall and cause personal injury.



A-Coil inverted to show how the 4 screws are removed.





This product is designed and intended for use in the residential and commercial environment.

Please be sure to put the contact address/telephone number on this manual before handing it to the customer.



Manufactured for:  
**MITSUBISHI ELECTRIC US, INC.**

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