MITSUBISHI ELECTRIC

Zuba Central
Heat Pump

ZUBA-CENTRAL

INSTALLATION MANUAL

FOR INSTALLER

For safe and correct use, read this manual thoroughly before installing the air-conditioner unit.

English

Contents:

Contents

1. Safety precautions

- **Before installing the unit, make sure you read all the "Safety precautions".**
- **Please report to or take consent by the supply authority before connection to the system.**

⚠ Warning:
Describes precautions that must be observed to prevent danger of injury or death to the user.

⚠ Caution:
Describes precautions that must be observed to prevent damage to the unit.

After installation work has been completed, explain the "Safety Precautions," use, and maintenance of the unit to the customer according to the information in the Operation Manual and perform the test run to ensure normal operation. Both the Installation Manual and Operation Manual must be given to the user for keeping. These manuals must be passed on to subsequent users.

⏚ : Indicates a part which must be grounded.

⚠ Warning:
Carefully read the labels affixed to the main unit.

⚠ Warning:

- **The unit must not be installed by the user. Ask a dealer or an authorized technician to install the unit. If the unit is installed incorrectly, water leakage, electric shock, or fire may result.**
- **For installation work, follow the instructions in the Installation Manual and use tools and pipe components specifically made for use with R410A refrigerant. The R410A refrigerant in the HFC system is pressurized 1.6 times the pressure of usual refrigerants. If pipe components not designed for R410A refrigerant are used and the unit is not installed correctly, the pipes may burst and cause damage or injuries. In addition, water leakage, electric shock, or fire may result.**
- **The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.**
- **The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.**
- **If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration in the room from exceeding the safety limit in the event of refrigerant leakage. Consult a dealer regarding the appropriate measures to prevent the allowable concentration from being exceeded. Should the refrigerant leak and cause the concentration limit to be exceeded, hazards due to lack of oxygen in the room may result.**
- **Ventilate the room if refrigerant leaks during operation. If refrigerant comes into contact with a flame, poisonous gases will be released.**
- **All electric work must be performed by a qualified technician according to local regulations and the instructions given in this manual. The units must be powered by dedicated power lines and the correct voltage and circuit breakers must be used. Power lines with insufficient capacity or incorrect electrical work may result in electric shock or fire.**
- **Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. If the pipes are not connected correctly, the unit will not be properly grounded and electric shock may result.**
- **Use only specified cables for wiring. The connections must be made securely without tension on the terminals. If the cables are connected or installed incorrectly, overheating or fire may result.**
- **The terminal block cover panel of the outdoor unit must be firmly attached. If the cover panel is mounted incorrectly and dust and moisture enter the unit, electric shock or fire may result.**
- **When installing or moving the air conditioner, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. Air enclosed in the lines can cause pressure peaks resulting in a rupture and other hazards.**
- **Use only accessories authorized by Mitsubishi Electric and ask a dealer or an authorized technician to install them. If accessories are incorrectly installed, water leakage, electric shock, or fire may result.**
- **Do not alter the unit. Consult a dealer for repairs. If alterations or repairs are not performed correctly, water leakage, electric shock, or fire may result.**
- **The user should never attempt to repair the unit or transfer it to another location. If the unit is installed incorrectly, water leakage, electric shock, or fire may result. If the air conditioner must be repaired or moved, ask a dealer or an authorized technician.**
- **After installation has been completed, check for refrigerant leaks. If refrigerant leaks into the room and comes into contact with the flame of a heater or portable cooking range, poisonous gases will be released.**

1.1. Before installation

⚠ Caution:

- **Do not use the unit in an unusual environment. If the air conditioner is installed in areas exposed to steam, volatile oil (including machine oil), or sulfuric gas, areas exposed to high salt content such as the seaside, or areas where the unit will be covered by snow, the performance can be significantly reduced and the internal parts can be damaged.**
- **Do not install the unit where combustible gases may leak, be produced, flow, or accumulate. If combustible gas accumulates around the unit, fire or explosion may result.**
- **The outdoor unit produces condensation during the heating operation. Make sure to provide drainage around the outdoor unit if such condensation is likely to cause damage.**
- **When installing the unit in a hospital or communications office, be prepared for noise and electronic interference. Inverters, home appliances, high-frequency medical equipment, and radio communications equipment can cause the air conditioner to malfunction or breakdown. The air conditioner may also affect medical equipment, disturbing medical care, and communications equipment, harming the screen display quality.**

1.2. Before installation (relocation)

⚠ Caution:

- **Be extremely careful when transporting the units. Two or more persons are needed to handle the unit, as it weighs 20 kg, 44 lbs or more. Do not grasp the packaging bands. Wear protective gloves to remove the unit from the packaging and to move it, as you can injure your hands on the fins or other parts.**
- **Be sure to safely dispose of the packaging materials. Packaging materials, such as nails and other metal or wooden parts may cause stabs or other injuries.**
- **The base and attachments of the outdoor unit must be periodically checked for looseness, cracks or other damage. If such defects are left uncorrected, the unit may fall down and cause damage or injuries.**
- **Do not clean the air conditioner unit with water. Electric shock may result.**
- **Tighten all flare nuts to specification using a torque wrench. If tightened too much, the flare nut can break after an extended period and refrigerant can leak out.**

1. Safety precautions

1.3. Before electric work

⚠ **Caution:**

- **Be sure to install circuit breakers. If not installed, electric shock may result.**
- **For the power lines, use standard cables of sufficient capacity. Otherwise, a short circuit, overheating, or fire may result.**
- **When installing the power lines, do not apply tension to the cables. If the connections are loosened, the cables can snap or break and overheating or fire may result.**
- **Be sure to ground the unit. Do not connect the ground wire to gas or water pipes, lighting rods, or telephone grounding lines. If the unit is not properly grounded, electric shock may result.**
- **Use circuit breakers (ground fault interrupter, isolating switch (+B fuse), and molded case circuit breaker) with the specified capacity. If the circuit breaker capacity is larger than the specified capacity, breakdown or fire may result.**

1.4. Before starting the test run

⚠ **Caution:**

- **Turn on the main power switch more than 12 hours before starting operation. Starting operation just after turning on the power switch can severely damage the internal parts. Keep the main power switch turned on during the operation season.**
- **Before starting operation, check that all panels, guards and other protective parts are correctly installed. Rotating, hot, or high voltage parts can cause injuries.**
- **Do not touch any switch with wet hands. Electric shock may result.**
- **Do not touch the refrigerant pipes with bare hands during operation. The refrigerant pipes are hot or cold depending on the condition of the flowing refrigerant. If you touch the pipes, burns or frostbite may result.**
- **After stopping operation, be sure to wait at least five minutes before turning off the main power switch. Otherwise, water leakage or breakdown may result.**

1.5. Using R410A refrigerant air conditioners

⚠ **Caution:**

- **Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust. Use pipes with the specified thickness. (Refer to page 5) Note the following if reusing existing pipes that carried R22 refrigerant.**

- Replace the existing flare nuts and flare the flared sections again.
- Do not use thin pipes. (Refer to page 5)

- **Store the pipes to be used during installation indoors and keep both ends of the pipes sealed until just before brazing. (Leave elbow joints, etc. in their packaging.) If dust, debris, or moisture enters the refrigerant lines, oil deterioration or compressor breakdown may result.**
- **Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections. If mineral oil is mixed in the refrigeration oil, oil deterioration may result.**
- **Do not use refrigerant other than R410A refrigerant. If another refrigerant is used, the chlorine will cause the oil to deteriorate.**
- **Use the following tools specifically designed for use with R410A refrigerant. The following tools are necessary to use R410A refrigerant. Contact your nearest dealer for any questions.**

Tools (for R410A)	
Gauge manifold	Flare tool
Charge hose	Size adjustment gauge
Gas leak detector	Vacuum pump adapter
Torque wrench	Electronic refrigerant charging scale

- **Be sure to use the correct tools. If dust, debris, or moisture enters the refrigerant lines, refrigeration oil deterioration may result.**
- **Do not use a charging cylinder. If a charging cylinder is used, the composition of the refrigerant will change and the efficiency will be lowered.**

2. Installation location

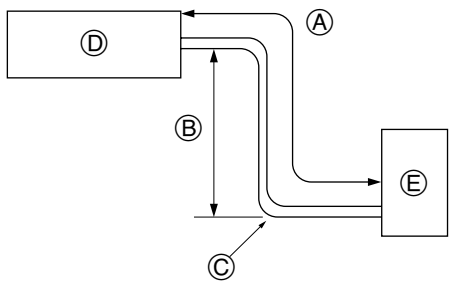


Fig. 2-1

■ **HA36** **(inch)**

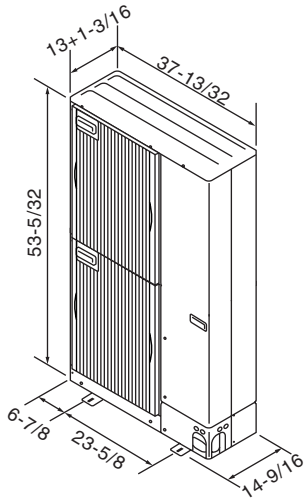


Fig. 2-2

2.1. Refrigerant pipe (Fig. 2-1)

▶ **Check that the difference between the heights of the indoor and outdoor units, the length of refrigerant pipe, and the number of bends in the pipe are within the limits shown below.**

Models	Ⓐ Pipe length (one way)	Ⓑ Height difference	Ⓒ Number of bends (one way)
HA36	Max. 75 m, 245 ft	Max. 30 m, 100 ft	Max. 15

- Height difference limitations are binding regardless of which unit, indoor or outdoor, is positioned higher.
  - Ⓓ Indoor unit
  - Ⓔ Outdoor unit

2.2. Choosing the outdoor unit installation location

- Avoid locations exposed to direct sunlight or other sources of heat.
- Select a location from which noise emitted by the unit will not inconvenience neighbors.
- Select a location permitting easy wiring and pipe access to the power source and indoor unit.
- Avoid locations where combustible gases may leak, be produced, flow, or accumulate.
- Note that water may drain from the unit during operation.
- Select a level location that can bear the weight and vibration of the unit.
- Avoid locations where the unit can be covered by snow. In areas where heavy snow fall is anticipated, special precautions such as raising the installation location or installing a hood on the air intake must be taken to prevent the snow from blocking the air intake or blowing directly against it. This can reduce the airflow and a malfunction may result.
- Avoid locations exposed to oil, steam, or sulfuric gas.
- Use the transportation handles of the outdoor unit to transport the unit. If the unit is carried from the bottom, hands or fingers may be pinched.

2.3. Outline dimensions (Outdoor unit) (Fig. 2-2)

The figure in parenthesis is for HA36 model.

2. Installation location

inch

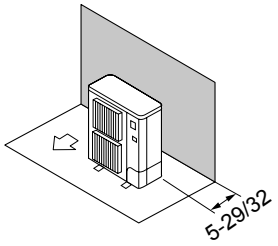


Fig. 2-6

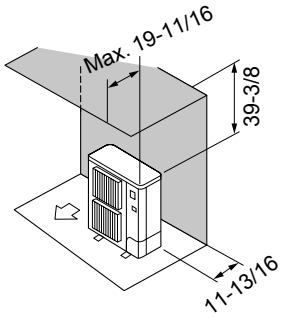


Fig. 2-7

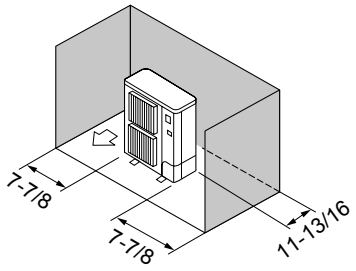


Fig. 2-8

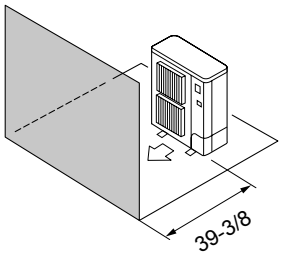


Fig. 2-9

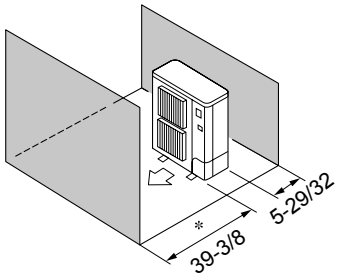


Fig. 2-10

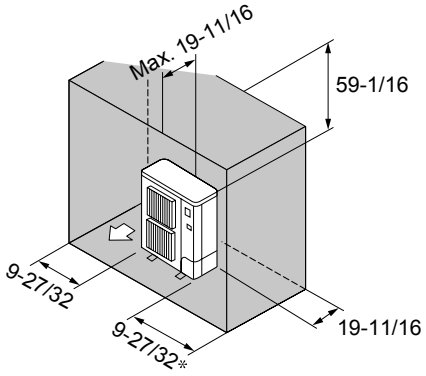


Fig. 2-11

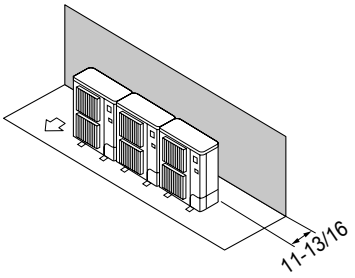


Fig. 2-12

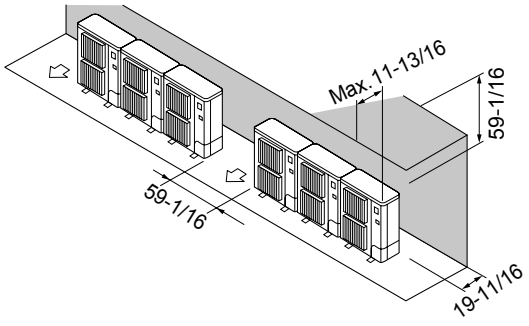


Fig. 2-13

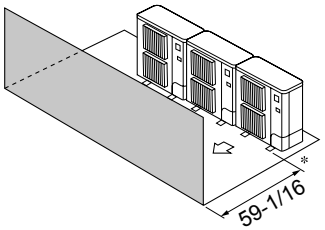


Fig. 2-14

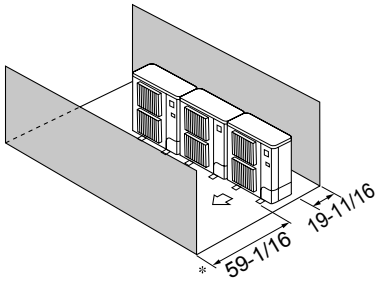


Fig. 2-15

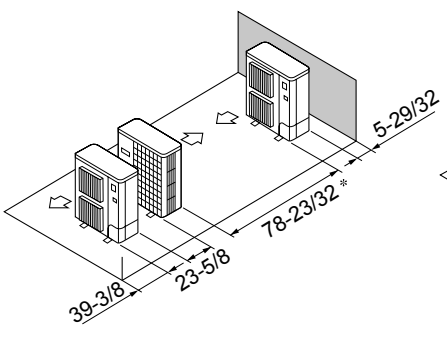


Fig. 2-16

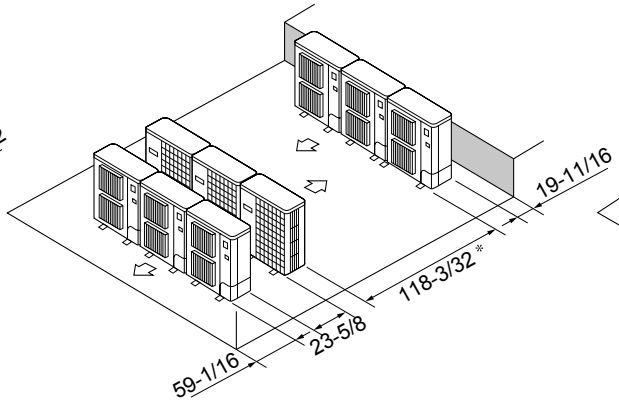


Fig. 2-17

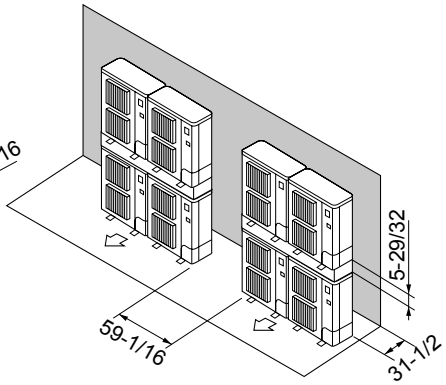


Fig. 2-18

2. Installation location

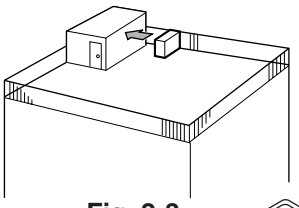


Fig. 2-3

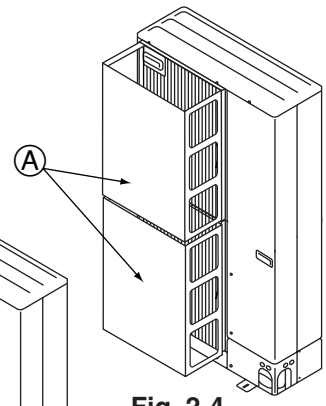


Fig. 2-4

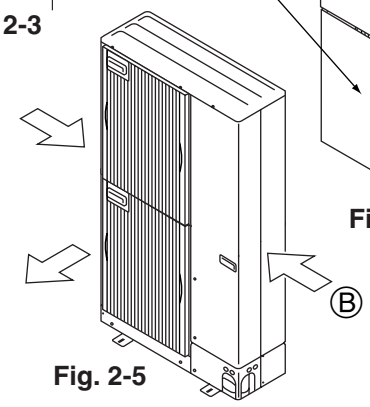


Fig. 2-5

2.4. Ventilation and service space

2.4.1. Windy location installation

When installing the outdoor unit on a rooftop or other location unprotected from the wind, situate the air outlet of the unit so that it is not directly exposed to strong winds. Strong wind entering the air outlet may impede the normal airflow and a malfunction may result.

The following shows three examples of precautions against strong winds.

① Face the air outlet towards the nearest available wall about 50 cm, 19-11/16 inch away from the wall. (Fig. 2-3)

② Install an optional air outlet guide and air guide if the unit is installed in a location where strong winds from a typhoon, etc. may directly enter the air outlet. (Fig. 2-4)

Ⓐ Air outlet guide

③ Position the unit so that the air outlet blows perpendicularly to the seasonal wind direction, if possible. (Fig. 2-5)

Ⓑ Wind direction

2.4.2. When installing a single outdoor unit (Refer to the last page)

Minimum dimensions are as follows, except for Max., meaning Maximum dimensions, indicated.

Refer to the figures for each case.

① Obstacles at rear only (Fig. 2-6)

② Obstacles at rear and above only (Fig. 2-7)

③ Obstacles at rear and sides only (Fig. 2-8)

④ Obstacles at front only (Fig. 2-9)

⑤ Obstacles at front and rear only (Fig. 2-10)

* When using an optional air outlet guide, the clearance for HA36 models is 500 mm, 19-11/16 inch or more.

⑥ Obstacles at rear, sides, and above only (Fig. 2-11)

- Do not install the optional air outlet guides for upward airflow.

2.4.3. When installing multiple outdoor units (Refer to the last page)

Leave 10 mm, 13/32 inch for HA36 space or more between the units.

① Obstacles at rear only (Fig. 2-12)

② Obstacles at rear and above only (Fig. 2-13)

- No more than three units must be installed side by side. In addition, leave space as shown.
- Do not install the optional air outlet guides for upward airflow.

③ Obstacles at front only (Fig. 2-14)

* When using an optional air outlet guide, the clearance for HA36 models is 1000 mm, 39-3/8 inch or more.

④ Obstacles at front and rear only (Fig. 2-15)

* When using an optional air outlet guide, the clearance for HA36 models is 1000 mm, 39-3/8 inch or more.

⑤ Single parallel unit arrangement (Fig. 2-16)

* When using an optional air outlet guide installed for upward airflow, the clearance is 500 mm, 19-11/16 inch or more.

⑥ Multiple parallel unit arrangement (Fig. 2-17)

* When using an optional air outlet guide installed for upward airflow, the clearance is 1000 mm, 39-3/8 inch or more.

⑦ Stacked unit arrangement (Fig. 2-18)

- The units can be stacked up to two units high.
- No more than two stacked units must be installed side by side. In addition, leave space as shown.

3. Installing the outdoor unit

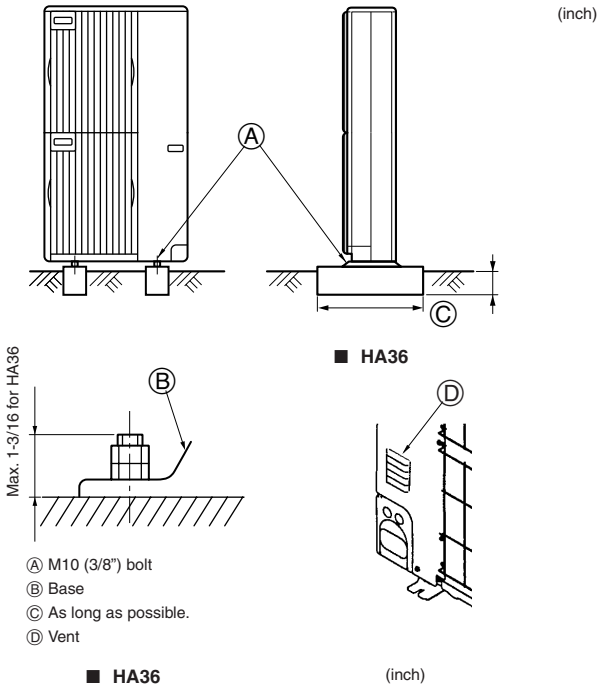


Fig. 3-1

- Be sure to install the unit in a sturdy, level surface to prevent rattling noises during operation. (Fig. 3-1)

<Foundation specifications>

Foundation bolt	M10 (3/8")
Thickness of concrete	120 mm, 4-23/32 inch
Length of bolt	70 mm, 2-3/4 ing
Weight-bearing capacity	320 kg, 264 lbs

- Make sure that the length of the foundation bolt is within 30 mm, 1-3/16 inch of the bottom surface of the base.
- Secure the base of the unit firmly with four-M10 foundation bolts in sturdy locations.

Installing the outdoor unit

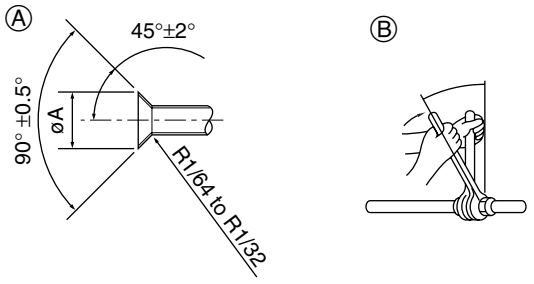
- Do not block the vent. If the vent is blocked, operation will be hindered and breakdown may result.
- In addition to the unit base, use the installation holes on the back of the unit to attach wires, etc., if necessary to install the unit. Use self-tapping screws (ø5 × 15 mm, ø13/16 × 19/32 inch or more) and install on site.

⚠ Warning:

- **The unit must be securely installed on a structure that can sustain its weight. If the unit is mounted on an unstable structure, it may fall down and cause damage or injuries.**
- **The unit must be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons, or strong winds. An incorrectly installed unit may fall down and cause damage or injuries.**

4. Installing the refrigerant piping

(inch)



Ⓐ Flare cutting dimensions
Ⓑ Flare nut tightening torque

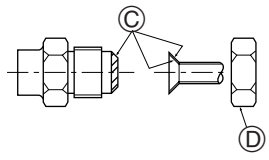


Fig. 4-1

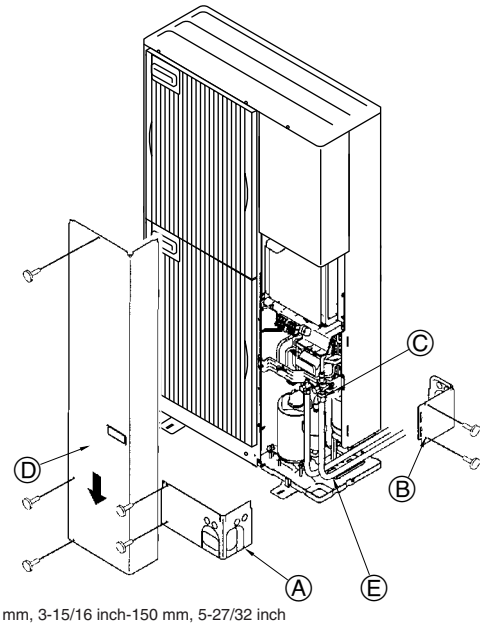
Ⓐ (Fig. 4-1)

Copper pipe O.D.		Flare dimensions øA dimensions	
(mm)	(inch)	(mm)	(inch)
ø6.35	1/4”	8.7 - 9.1	11/32 - 23/64
ø9.52	3/8”	12.8 - 13.2	1/2 - 33/64
ø12.7	1/2”	16.2 - 16.6	41/64 - 21/32
ø15.88	5/8”	19.3 - 19.7	49/64 - 25/32

Ⓑ (Fig. 4-1)

Copper pipe O.D.		Flare nut O.D.		Tightening torque	
(mm)	(inch)	(mm)	(inch)	(N·m)	(ft·lbs)
ø6.35	1/4”	17	43/64	14 - 18	10 - 13
ø9.52	3/8”	22	7/8	34 - 42	25 - 30
ø12.7	1/2”	26	1 - 3/64	49 - 61	35 - 44
ø15.88	5/8”	29	1 - 9/64	68 - 82	49 - 59

■ **HA36**



Ⓐ Front piping cover
Ⓑ Piping cover
Ⓒ Stop valve
Ⓓ Service panel
Ⓔ Band radius : 100 mm, 3-15/16 inch-150 mm, 5-27/32 inch

Fig. 4-3

4.1. Precautions for devices that use R410A refrigerant

- **Refer to page 3 for precautions not included below on using air conditioners with R410A refrigerant.**
- **Use ester oil, ether oil, alkylbenzene oil (small amount) as the refrigeration oil applied to the flared sections.**
- **Use C1220 copper phosphorus, for copper and copper alloy seamless pipes, to connect the refrigerant pipes. Use refrigerant pipes with the thicknesses specified in the table to the below. Make sure the insides of the pipes are clean and do not contain any harmful contaminants such as sulfuric compounds, oxidants, debris, or dust.**

⚠ **Warning:**
When installing or moving the air conditioner, use only the specified refrigerant (R410A) to charge the refrigerant lines. Do not mix it with any other refrigerant and do not allow air to remain in the lines. Air enclosed in the lines can cause pressure peaks resulting in a rupture and other hazards.

	HA36
Liquid pipe	ø9.52 mm, 3/8 inch thickness 0.8 mm, 1/32 inch
Gas pipe	ø15.88 mm, 5/8 inch thickness 1.0 mm, 3/64 inch

- **Do not use pipes thinner than those specified above.**

4.2. Connecting pipes (Fig. 4-1)

- When commercially available copper pipes are used, wrap liquid and gas pipes with commercially available insulation materials (heat-resistant to 100 °C, 212 °F or more, thickness of 12 mm, 1/2 inch or more).
- The indoor parts of the drain pipe should be wrapped with polyethylene foam insulation materials (specific gravity of 0.03, thickness of 9 mm, 23/64 inch or more).
- Apply thin layer of refrigerant oil to pipe and joint seating surface before tightening flare nut. Ⓐ
- Use two wrenches to tighten piping connections. Ⓑ
- Use leak detector or soapy water to check for gas leaks after connections are completed.
- Apply refrigerating machine oil over the entire flare seat surface. Ⓒ
- Use the flare nuts for the following pipe size. Ⓓ

		HA36
Gas side	Pipe size (mm, inch)	ø15.88, 5/8”
Liquid side	Pipe size (mm, inch)	ø9.52, 3/8”

*1: The flare nut is attached to its pipe.
*2: The flare nut is in the outdoor unit accessory.
Do not use the flare nut attached. If it is used, a gas leakage or even a pipe extraction may occur.

- When bending the pipes, be careful not to break them. Bend radii of 100 mm, 3-15/16 inch to 150 mm, 5-27/32 inch are sufficient.
- Make sure the pipes do not contact the compressor. Abnormal noise or vibration may result.

① Pipes must be connected starting from the indoor unit.
Flare nuts must be tightened with a torque wrench.
② Flare the liquid pipes and gas pipes and apply a thin layer of refrigeration oil (Applied on site).

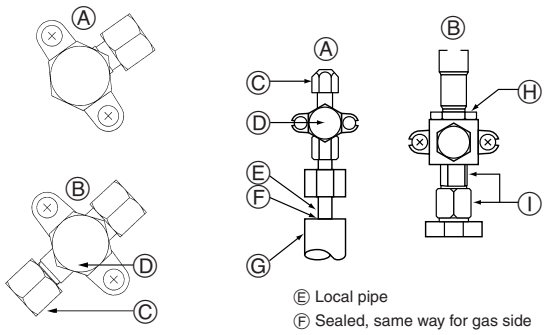
4.3. Refrigerant piping (Fig. 4-3)

■ **For HA36**

Remove the service panel Ⓓ (three screws) and the front piping cover Ⓐ (two screws) and rear piping cover Ⓑ (two screws).
① Perform refrigerant piping connections for the indoor/outdoor unit when the outdoor unit's stop valve is completely closed.
② Vacuum-purge air from the indoor unit and the connection piping.
③ After connecting the refrigerant pipes, check the connected pipes and the indoor unit for gas leaks. (Refer to 4.4 Refrigerant pipe airtight testing method)
④ Vacuumize the refrigerant lines through the service port of the liquid stop valve and then open the stop valves completely (for both the liquid and gas stop valves). This will completely connect the refrigerant lines of the indoor and outdoor units.
- If the stop valves are left closed and the unit is operated, the compressor and control valves will be damaged.
- Use a leak detector or soapy water to check for gas leaks at the pipe connection sections of the outdoor unit.
- Do not use the refrigerant from the unit to purge air from the refrigerant lines.
- After the valve work is completed, tighten the valve caps to the correct torque: 20 to 25 N·m, 14 to 18 ft·lbs (200 to 250 kgf·cm).
Failure to replace and tighten the caps may result in refrigerant leakage. In addition, do not damage the insides of the valve caps as they act as a seal to prevent refrigerant leakage.

⑤ Use sealant to seal the ends of the thermal insulation around the pipe connection sections to prevent water from entering the thermal insulation.

4. Installing the refrigerant piping



Ⓐ Stop valve <Liquid side>
Ⓑ Stop valve <Gas side>
Ⓒ Service port
Ⓓ Open/Close section
Ⓔ Local pipe
Ⓕ Sealed, same way for gas side
Ⓖ Pipe cover
Ⓗ Do not use a wrench here. Refrigerant leakage may result.
Ⓘ Use two wrenches here.

Fig. 4-4

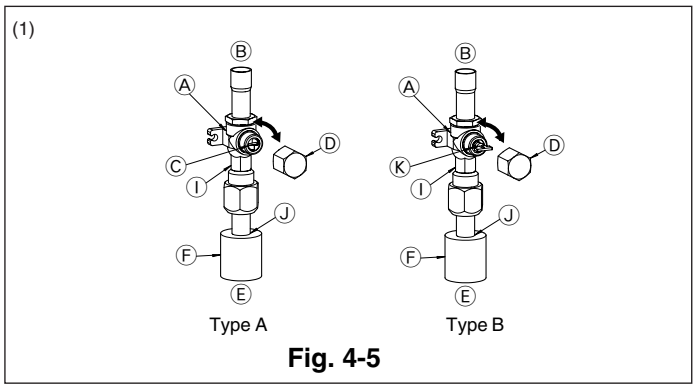


Fig. 4-5

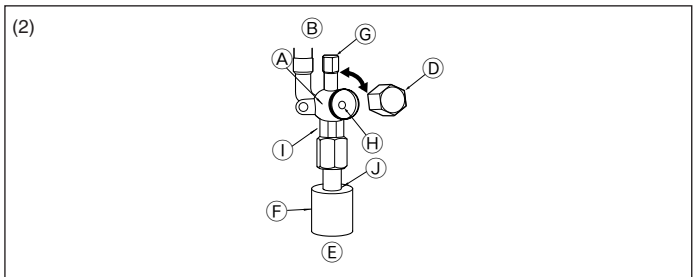
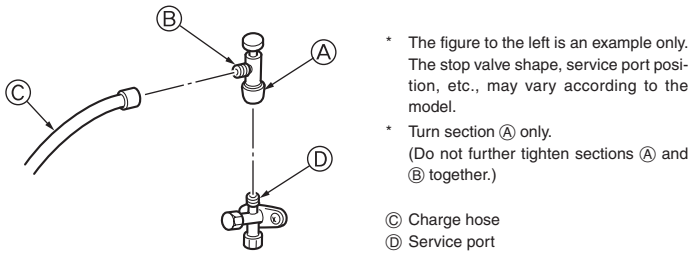


Fig. 4-6



* The figure to the left is an example only. The stop valve shape, service port position, etc., may vary according to the model.
* Turn section Ⓐ only. (Do not further tighten sections Ⓐ and Ⓑ together.)

Ⓒ Charge hose
Ⓓ Service port

Fig. 4-7

4.4. Refrigerant pipe airtight testing method

(1) Connect the testing tools.
- Make sure the stop valves Ⓐ Ⓑ are closed and do not open them.
- Add pressure to the refrigerant lines through the service port Ⓒ of the liquid stop valve Ⓓ.

(2) Do not add pressure to the specified pressure all at once; add pressure little by little.
① Pressurize to 0.5 MPa (5 kgf/cm²G), wait five minutes, and make sure the pressure does not decrease.
② Pressurize to 1.5 MPa (15 kgf/cm²G), wait five minutes, and make sure the pressure does not decrease.
③ Pressurize to 4.15 MPa (41.5 kgf/cm²G) and measure the surrounding temperature and refrigerant pressure.

(3) If the specified pressure holds for about one day and does not decrease, the pipes have passed the test and there are no leaks.
- If the surrounding temperature changes by 1 °C, the pressure will change by about 0.01 MPa (0.1 kgf/cm²G). Make the necessary corrections.

(4) If the pressure decreases in steps (2) or (3), there is a gas leak. Look for the source of the gas leak.

4.5. Stop valve opening method

(1) Gas side of HA36 (Fig. 4-5)
Type A
① Remove the cap, then turn one-quarter rotation counter-clockwise with a flat-bladed screwdriver to complete open.
② Check that the valves are fully open, then return the cap to its original state and tighten it down.
Type B
① Remove the cap, pull the handle toward you and rotate 1/4 turn in a counterclockwise direction to open.
② Make sure that the stop valve is open completely, push in the handle and rotate the cap back to its original position.
(2) Liquid side of HA36. (Fig. 4-6)
① Remove the cap and turn the valve rod counterclockwise as far as it will go with the use of a 4 mm hexagonal wrench. Stop turning when it hits the stopper. (ø6.35, 1/4 inch: Approximately 4.5 revolutions) (ø9.52, 3/8 inch: Approximately 10 revolutions)
② Make sure that the stop valve is open completely, push in the handle and rotate the cap back to its original position.

Ⓐ Valve
Ⓑ Unit side
Ⓒ Operation section
Ⓓ Cap
Ⓔ Local pipe side
Ⓕ Pipe cover
Ⓖ Service port
Ⓗ Wrench hole
Ⓘ Double spanner section (Do not apply a spanner other than to this section. Doing so would cause coolant leaks.)
Ⓙ Seal section (Seal the end of the heat insulation material at the pipe connection section with whatever seal material you have on hand so that water does not infiltrate the heat insulation material.)
Ⓚ Handle

Refrigerant pipes are protectively wrapped for HA36
- The pipes can be protectively wrapped up to a diameter of ø90 mm, 3-35/64 inch before or after connecting the pipes. Cut out the knockout in the pipe cover following the groove and wrap the pipes.

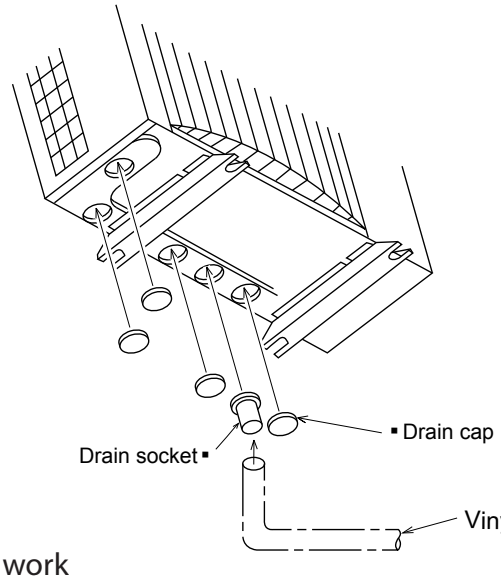
Pipe inlet gap for HA36
- Use putty or sealant to seal the pipe inlet around the pipes so that no gaps remain. (If the gaps are not closed, noise may be emitted or water and dust will enter the unit and breakdown may result.)

Precautions when using the charge valve (Fig.4-7)
Do not tighten the service port too much when installing it, otherwise, the valve core could be deformed and become loose, causing a gas leak.
After positioning section Ⓑ in the desired direction, turn section Ⓐ only and tighten it. Do not further tighten sections Ⓐ and Ⓑ together after tightening section Ⓐ .

4.6. Addition of refrigerant

- Additional charging is not necessary if the pipe length does not exceed 20 m, 70 ft for HA36.
- If the pipe length exceeds the specified length above, charge the unit with additional R410A refrigerant according to the permitted pipe lengths in the chart below.
  * When the unit is stopped, charge the unit with the additional refrigerant through the liquid stop valve after the pipe extensions and indoor unit have been vacuumized.
  When the unit is operating, add refrigerant to the gas check valve using a safety charger. Do not add liquid refrigerant directly to the check valve.
  * After charging the unit with refrigerant, note the added refrigerant amount on the service label (attached to the unit).
  Refer to the “1.5. Using R410A refrigerant air conditioners” for more information.
- Be careful when installing multiple units. Connecting to an incorrect indoor unit can lead to abnormally high pressure and have a serious effect on operation performance.

Model	Max pipe length	Max height difference	Additional refrigerant charging amount															
			30 m 100 ft	33 m 110 ft	37 m 120 ft	40 m 130 ft	43 m 140 ft	46 m 150 ft	49 m 160 ft	52 m 170 ft	55 m 180 ft	58 m 190 ft	61 m 200 ft	64 m 210 ft	67 m 220 ft	70 m 230 ft	73 m 240 ft	75 m 245 ft
HA36	75 m, 245 ft	30 m, 100 ft	0 oz 0 kg	6 oz 0.2 kg	12 oz 0.4 kg	18 oz 0.5 kg	24 oz 0.7 kg	30 oz 0.9 kg	36 oz 1.0 kg	42 oz 1.2 kg	48 oz 1.4 kg	54 oz 1.5 kg	60 oz 1.7 kg	66 oz 1.9 kg	72 oz 2.0 kg	78 oz 2.2 kg	84 oz 2.3 kg	86 oz 2.4 kg



5. Drainage piping work

Outdoor unit drainage pipe connection
When drain piping is necessary, use the drain socket or the drain pan (option).

	HA36
Drain socket	PAC-SG61DS-E
Drain pan	PAC-SG64DP-E

6. Electrical work

6.1. Outdoor unit (Fig. 6-1, Fig. 6-2)

1 Remove the service panel.
2 Wire the cables referring to the Fig. 6-1 and the Fig. 6-2.

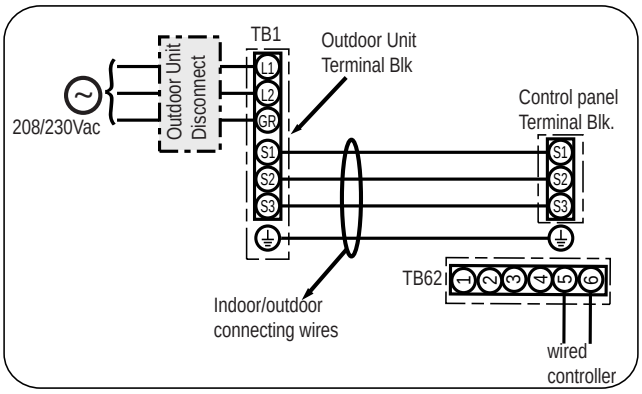
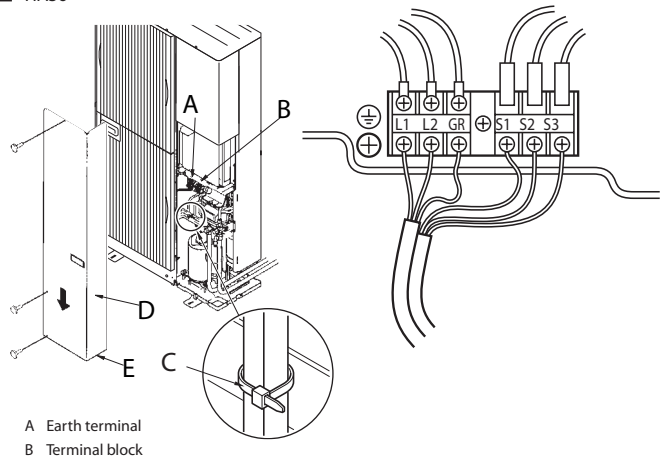


Fig. 6-1

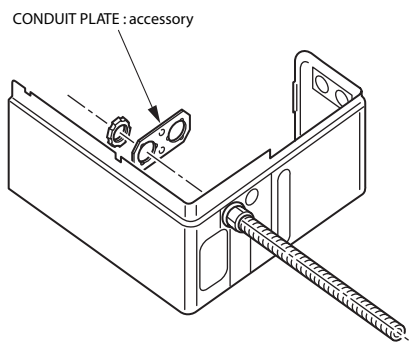
■ HA36



A Earth terminal
B Terminal block
C Clamp
D Service panel
E Wire the cables so that they do not contact the center of the service panel or the gas valve.

Fig. 6-2

■ HA36



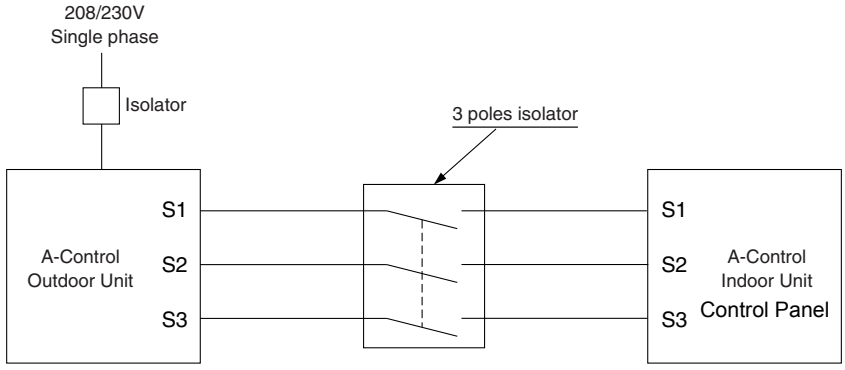
6. Electrical work

6.2. Field electrical wiring

Outdoor unit model			HA36
Outdoor unit power supply			Single, 208/230 V, 60 Hz
Breaker size			30A
Minimum circuit ampacity			28A
Maximum rating of overcurrent protective device			40A
Wiring Wire No. × size	Outdoor unit power supply		2 × Min. AWG 10
	Outdoor unit power supply earth		1 × Min. AWG 10
	Indoor unit-Outdoor unit	*1	3 × AWG 14 (polar)
	Indoor unit earth	*1	1 × Min. AWG 14
	Remote controller-Indoor unit	*2	2 × AWG 22 (Non-polar)
Circuit rating	Outdoor unit L1-L2	*3	AC 208/230 V
	Indoor unit-Outdoor unit S1-S2	*3	AC 208/230 V
	Indoor unit-Outdoor unit S2-S3	*3	DC 24 V
	Remote controller-Indoor unit	*3	DC 12 V

*1. Max. 45 m, 147 ft
If 2.5 mm^2 used, Max. 50 m, 164 ft
If 2.5 mm^2 used and S3 separated, Max. 80 m, 262 ft
*2. The 10 m, 30 ft wire is attached in the remote controller accessory. Max 1500 ft
*3. The figures are NOT always against the ground.
S3 terminal has DC 24 V against S2 terminal. However between S3 and S1, these terminals are NOT electrically insulataed by the transformer or other device.

Notes: 1. Wiring size must comply with the applicable local and national code.
2. Use copper supply wires.
3. Use wires rated 300V or more for the power supply cables and the indoor/outdoor unit connecting cables.
4. Install an earth longer than other cables.



⚠ **Warning:**
In case of A-control wiring, there is high voltage potential on the S3 terminal caused by electrical circuit design that has no electrical insulation between power line and communication signal line. Therefore, please turn off the main power supply when servicing. And do not touch the S1, S2, S3 terminals when the power is energized. If isolator should be used between indoor unit and outdoor unit, please use 3-poles type.

⚠ **Warning:**
- **Turn on the main power when the ambient temperature is -20°C, -4°F or higher.**
- **In below -20°C, -4°F condition, it needs at least 4hr standby to operate in order to warm the electrical parts.**

7. Test run

7.1. Before test run

- **After completing installation and the wiring and piping of the indoor and outdoor units, check for refrigerant leakage, looseness in the power supply or control wiring, wrong polarity, and no disconnection of one phase in the supply.**
- **Use a 500-volt megohmmeter to check that the resistance between the power supply terminals and ground is at least 1.0MΩ.**
- **Do not carry out this test on the control wiring (low voltage circuit) terminals.**

⚠ **Warning:**

Do not use the air conditioner if the insulation resistance is less than 1.0MΩ.

Insulation resistance

After installation or after the power source to the unit has been cut for an extended period, the insulation resistance will drop below 1 MΩ due to refrigerant accumulating in the compressor. This is not a malfunction. Perform the following procedures.

1. Remove the wires from the compressor and measure the insulation resistance of the compressor.
2. If the insulation resistance is below 1 MΩ, the compressor is faulty or the resistance dropped due the accumulation of refrigerant in the compressor.
3. After connecting the wires to the compressor, the compressor will start to warm up after power is supplied. After supplying power for the times indicated below, measure the insulation resistance again.
   - The insulation resistance drops due to accumulation of refrigerant in the compressor. The resistance will rise above 1 MΩ after the compressor is warmed up for two to three hours.
     (The time necessary to warm up the compressor varies according to atmospheric conditions and refrigerant accumulation.)
   - To operate the compressor with refrigerant accumulated in the compressor, the compressor must be warmed up at least 12 hours to prevent breakdown.
4. If the insulation resistance rises above 1 MΩ, the compressor is not faulty.

⚠ **Caution:**

- **The compressor will not operate unless the power supply phase connection is correct.**
- **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.

- **The followings must be checked as well.**

- The outdoor unit is not faulty. LED1 and LED2 on the control board of the outdoor unit flash when the outdoor unit is faulty.
- Both the gas and liquid stop valves are completely open.
- A protective sheet covers the surface of the DIP switch panel on the control board of the outdoor unit. Remove the protective sheet to operate the DIP switches easily.
- Make sure that the all of the SW5 DIP switches for function changes on the control board of the outdoor unit are set to OFF. If all of the SW5 switches are not set to OFF, record the settings and then set all of the switches to OFF. Begin recovering the refrigerant. After moving the unit to a new location and completing the test run, set the SW5 switches to the previously recorded settings.

7.2. Test run

7.2.1. Using SW4 in outdoor unit

1) PUH Type, PUZ Type

SW4-1	ON	Cooling operation
SW4-2	OFF	
SW4-1	ON	Heating operation
SW4-2	ON	

* After performing the test run, set SW4-1 to OFF.

- After power is supplied, a small clicking noise may be heard from the inside of the outdoor unit. The electronic expansion valve is opening and closing. The unit is not faulty.
- A few seconds after the compressor starts, a clanging noise may be heard from the inside of the outdoor unit. The noise is coming from the check valve due to the small difference in pressure in the pipes. The unit is not faulty.

The test run operation mode cannot be changed by DIP switch SW4-2 during the test run. (To change the test run operation mode during the test run, stop the test run by DIP switch SW4-1. After changing the test run operation mode, resume the test run by switch SW4-1.)

7.2.2. Using remote controller

Refer to the indoor unit installation manual.

8. Special Functions

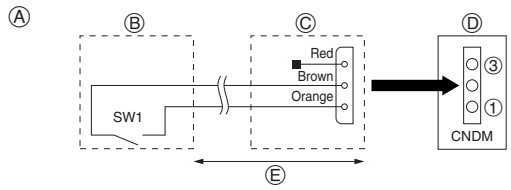


Fig. 8-1

Ⓐ Circuit diagram example (low noise mode)
Ⓑ On-site arrangement
Ⓒ External input adapter (PAC-SC36NA)
Ⓓ Outdoor unit control board
Ⓔ Max. 10 m, 33 ft

8.1. Low noise mode (on-site modification) (Fig. 8-1)

By performing the following modification, operation noise of the outdoor unit can be reduced by about 3-4 dB.
The low noise mode will be activated when a commercially available timer or the contact input of an ON/OFF switch is added to the CNDM connector (option) on the control board of the outdoor unit.

- The capacity may be insufficient according to the outdoor temperature and conditions, etc.

① Complete the circuit as shown when using the external input adapter (PAC-SC36NA). (Option)
② SW1 ON: Low noise mode
SW1 OFF: Normal operation

8.3. Refrigerant collecting (pump down)

Perform the following procedures to collect the refrigerant when moving the indoor unit or the outdoor unit.

① Before collecting the refrigerant, first make sure that the all of the SW5 DIP switches for function changes on the control board of the outdoor unit are set to OFF. If all of the SW5 switches are not set to OFF, record the settings and then set all of the switches to OFF. Start collecting the refrigerant. After moving the unit to a new location and completing the test run, set the SW5 switches to the previously recorded settings.
② Supply power (circuit breaker).
* When power is supplied, make sure that "CENTRALLY CONTROLLED" is not displayed on the remote controller. If "CENTRALLY CONTROLLED" is displayed, the refrigerant collecting (pump down) cannot be completed normally.
③ After the gas stop valve is closed, set the SWP switch on the control board of the outdoor unit to ON. The compressor (outdoor unit) and ventilators (indoor and outdoor units) start operating and refrigerant collecting operation begins. LED1 and LED2 on the control board of the outdoor unit are lit.
* Only set the SWP switch (push-button type) to ON if the unit is stopped. However, even if the unit is stopped and the SWP switch is set to ON less than three minutes after the compressor stops, the refrigerant collecting operation cannot be performed. Wait until compressor has been stopped for three minutes and then set the SWP switch to ON again.
④ Because the unit automatically stops in about two to three minutes after the refrigerant collecting operation (LED1 and LED2 are lit), be sure to quickly close the gas stop valve. When LED1 and LED2 are lit and the outdoor unit is stopped, open the liquid stop valve completely, and then repeat step ③ after three minutes have passed.
* If the refrigerant collecting operation has been completed normally (LED1 and LED2 are lit), the unit will remain stopped until the power supply is turned off.
⑤ Turn off the power supply (circuit breaker).

9. System control (Fig. 9-1)

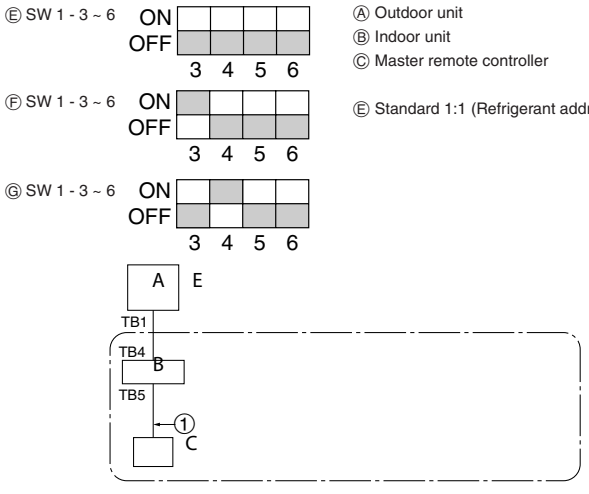


Fig. 9-1

Ⓐ Outdoor unit
Ⓑ Indoor unit
Ⓒ Master remote controller

Ⓔ Standard 1:1 (Refrigerant address = 00)

* Set the refrigerant address using the DIP switch of the outdoor unit.
① Wiring from the Remote Control
This wire is connected to TB5 (terminal board for remote controller) of the indoor unit (non-polar).

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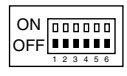
Note:
In single refrigerant system (twin), there is no need of wiring ②.

SW1
Function table

<SW1>



	Function	Operation according to switch setting	
		ON	OFF
SW1 function settings	1 Compulsory defrosting	Start	Normal
	2 Error history clear	Clear	Normal
	3 Refrigerant system address setting 4 5 6	Settings for outdoor unit addresses 0 to 15	

ZUBA CENTRAL
Multi-position Air Handler Installation Instructions

Table of Contents

INSTALLATION INSTRUCTIONS

Inspect Shipment

⚠WARNING

Excessive Weight Hazard
Use two or more people to move and install air handler.
Failure to do so can result in back or other injury.

These air handlers are completely factory assembled, and all components are performance tested. Each unit consists of a blower assembly, refrigerant coil and controls, in an insulated, galvanized steel, factory-finished enclosure. Knockouts are provided for electrical wiring entrance.

1. Check the unit rating plate to confirm specifications are as ordered.
2. Upon receipt of equipment, carefully inspect it for possible shipping damage. Take special care to examine the unit if the carton is damaged.

If damage is found, it should be noted on the carrier's freight bill. Damage claims should be filed with the carrier immediately. Claims of shortages should be filed with the seller within 5 days.
NOTE: If any damages are discovered and reported to the carrier, do not install the unit because your claim may be denied.

ISO 9001:2000 Registered Quality System

10.0 INSTALLATION REQUIREMENTS

These instructions are intended as a general guide only and do not supersede any national or local codes in any way. Compliance with all local, provincial, or national codes pertaining to this type of equipment should be determined prior to installation.

Read this entire instruction manual, as well as the instructions supplied in separate equipment, before starting the installation.

All models are designed for indoor installation only.

The installation of the air handler, field wiring, warm air ducts, etc. must conform to the requirements of the National Electrical Code, ANSI/NFPA No. 70 (latest edition) in the United States, and any state laws, and local ordinances (including plumbing or wastewater codes). Local authorities having jurisdiction should be consulted before installation is made. Such applicable regulations or requirements take precedence over the general instructions in this manual.

Install the conditioned air plenum, ducts and air filters (not provided) in accordance with NFPA 90B Standard for the Installation of Warm Air Heating and Air-Conditioning Systems (latest edition).

The air handler is shipped from the factory completely assembled. Some models are configured for upflow air discharge only, and some models are configured for upflow or horizontal left-hand air discharge.

Do not remove the cabinet knockouts until it has been determined which knockouts would need to be removed for the installation.

Select the final installation position that best suits the site conditions. Consider required clearances, space, routing requirements for refrigerant line, condensate disposal, filters, ductwork, wiring, and accessibility for service. Refer to the air handler rating plate on the air handler for specific information.

Tools and Parts Needed

Assemble the required tools and parts before starting installation. Read and follow the instructions provided with any tools listed here.

- ¼" nut driver
- Level
- Screwdriver
- Adjustable wrench
- Tape measure
- Hammer
- Sealant

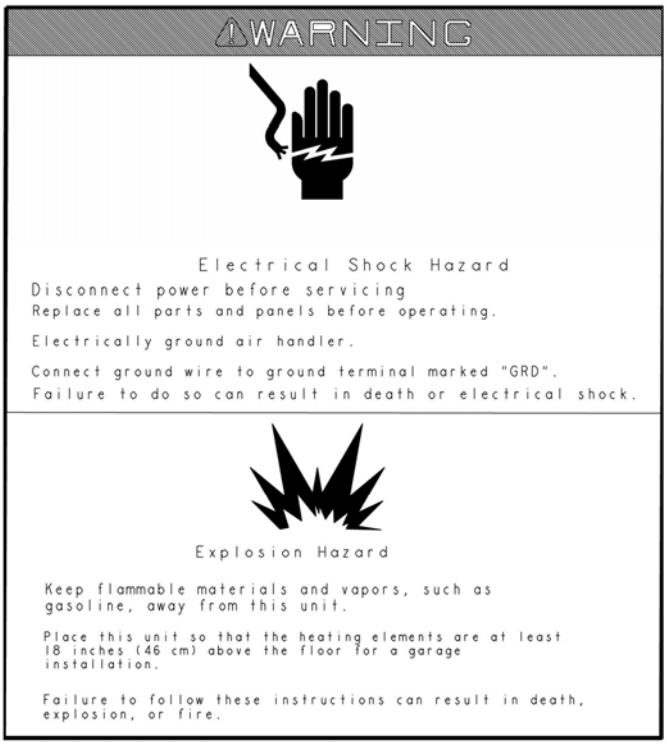
Check local codes, check existing electrical supply, and read "Ductwork Requirements," and "Electrical Requirements," before purchasing parts.

- UL listed wire nuts
- ZUBA CENTRAL AHU does not require an orifice. The AHU orifice orifice has been removed

10.1 Outdoor System Requirements

The air handler is designed to match and work with PUZ-HA36NHA outdoor unit as rated. The indoor AHU is manufactured to work with the outdoor unit which has a refrigerant metering orifice (linear expansion valve LEV).

Location Requirements



NOTE: When the unit is installed in a very humid space and used in cooling applications, excessive sweating may occur on outside of unit. To prevent excessive sweating wrap unit with

1” fiberglass insulation. All openings should be sealed to prevent air leakage that could cause condensate to form inside the cabinet.

- If installed in an unconditioned space, sealant should be applied around the electrical wires, refrigerant tubing, and condensate lines where they enter the cabinet.
- Electrical wires should be sealed on the inside where they exit the conduit opening. Sealant is required to prevent air leakage into and condensate from forming inside the air handler, control box, and on electrical controls.
- The air handler must be installed in such a way as to allow free access to the coil/filter compartment and blower/control compartment.

10.2 Installation Clearances

Non-Ducted Return Closet Installation

The air handler can be installed in a closet with a false bottom to form a return air plenum or be installed with a return air plenum under the air handler.

Louvers or return air grilles are field supplied. Local codes may limit application of systems without a ducted return to single-story buildings.

- Install louvers in a closet. Use the “Minimum Filter Requirements Chart” to determine the opening size that will provide the amount of free air you will require. If using louvers or grilles, match the free area rating of the louver or grille to the Minimum Return Air Free Area you determined to be necessary by consulting the “Minimum Filter Requirements Chart.”
- If the free area is not known, assume a 25% free area for wood or a 75% free area for metal louvers or grilles.
- If the return air plenum is used, the return air grille should be immediately in front of the opening in the plenum to allow for the free flow of return air.
- When not installed in front of the opening, there must be adequate clearance around the air handler to allow for the free flow of return air.

10.3 Installation Configuration Options

For ease in installation, it is best to make any necessary coil configuration changes before setting air handler in place. See “Installation Configuration Options.”

- Vertical upflow Air Handlers only contain 1 drain pan.
- Multi-position Air Handlers contain 2 drain pans.

Vertical Installations

Upflow

The air handler must be supported on the bottom only and set on solid floor or field supplied supporting frame. Securely attach the air handler to the floor or supporting frame. For best efficiency and airflow, horizontal drain pan (if installed) should be removed from units in upflow configurations.

Horizontal Installations

Horizontal installations can be left-hand or right-hand air supply.

Adequate support must be provided to ensure cabinet integrity. Units mounted horizontal should be mounted with a slight angle toward the drain connections to be used so that the drain pan will empty completely without water standing in the pan. Ensure that there is adequate room to remove service and access panels if installing in the horizontal position.

IMPORTANT:

- This coil is provided with a secondary drain that should be trapped and piped to a location that will give the occupant a visual warning that the primary drain is clogged. See “Install Condensate Drain.”
- When an evaporator coil is installed in an attic or above a finished ceiling, an auxiliary drain pan should be provided under the air handler as specified by most local building codes.

Conversion from Vertical to Horizontal

A vertical only air handler may be converted to horizontal air discharge by installing a horizontal drain pan kit (see accessories).

A multi-position air handler may be converted from horizontal left-hand discharge to horizontal right-hand discharge without additional parts.

Suspended Cabinet Installation

NOTE: Air handlers cannot be installed horizontally lying on or suspended from either the front or back of the air handler. It must be positioned with one side parallel to the floor when in the horizontal position.

The suspending means must be field fabricated, and should consist of two “cradles” made by attaching two rods to a length of angle iron or suitable gauge steel.

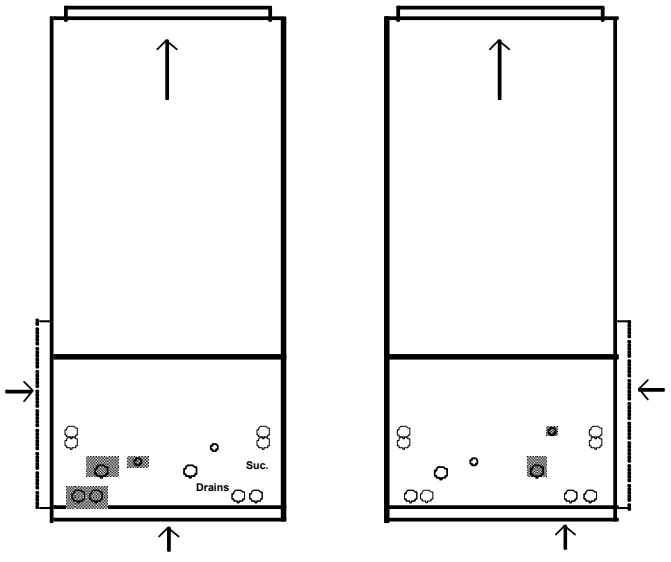


Figure 10. Air Handler in vertical position. 36 size models are side air return capable. Side return field installed filter rack available as an accessory. Side of cabinet must be cut to obtain side air return access.

10.4 Drain Pan Connections

Horizontal installations can be either “Right” or “Left.”

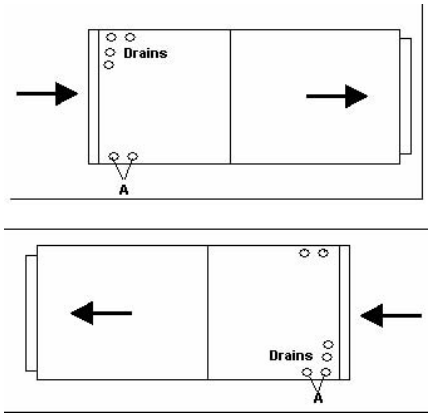


Figure 10.1 Air Handler in horizontal right and left positions respectively. Use condensate drains with the letter-A. Depending on the air handler a horizontal drain pan location change may be required.

Right-to-Left or Left-to-Right Airflow Conversion (36 MBTUH Size Models)

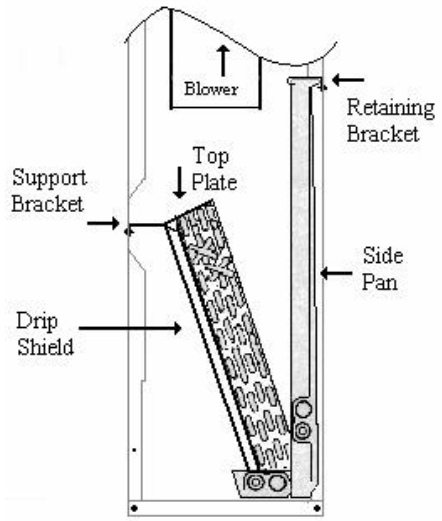


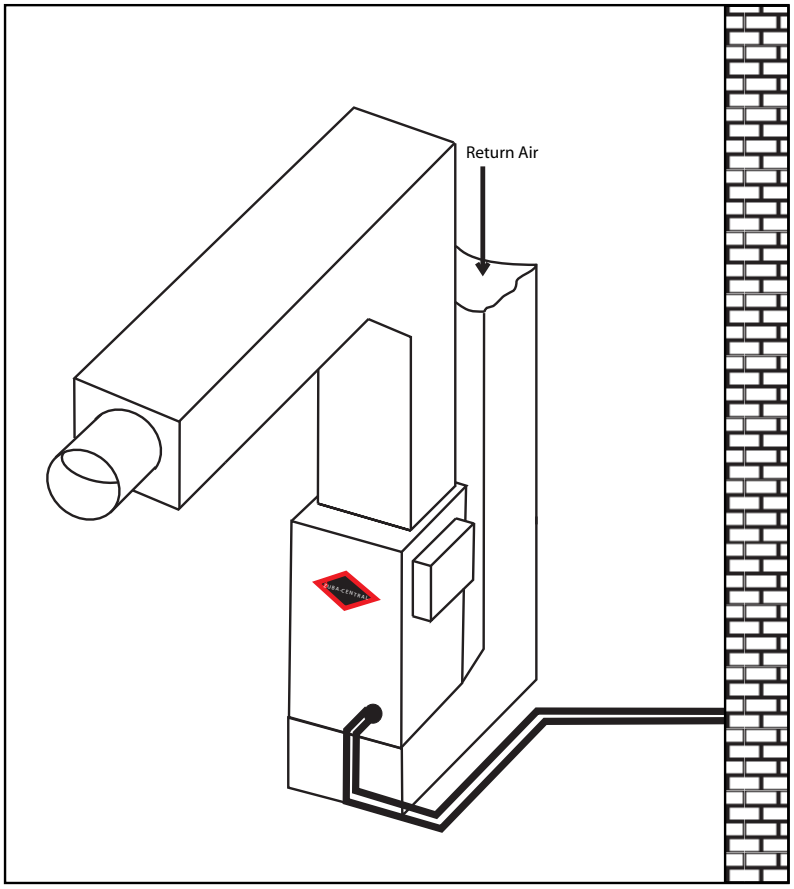
Figure 10.2 Drawing of Air Handler (12-30, or 36 MBTUH Size Model) in vertical position ready for Left-to-Right airflow if desired.

5. If the air handler is to be used for upflow, the horizontal pan and bracket can be discarded.
6. Remove the 4 screws holding the top cap on the coil.
7. Turn the top plate 180° and reinstall on the coil.
8. Remove the screws holding the coil bracket to the top plate. Slide the coil support toward the header end until the 2 new screw holes line up. Reinstall screws.
9. Remove drip shield from front left-hand side of coil assembly and attach to front right-hand side.
10. Repeat for the rear drip shields Failure to move drip shields will allow air by-pass around coil.
11. If needed for horizontal installation, slide the horizontal drain pan over the bottom pan. If vertical application, only install bottom pan. Install the pan(s) into bottom left hand side of the air handler. If installed properly the drains should match knockouts on the connection panel. (Refer to drawing)
12. Install coil assembly back into unit.
13. Re-install slant coil support bracket retaining screws.
14. Determine knockouts required and remove from panels accordingly.

1. Remove and set aside all front panels.
2. Locate slant coil support bracket and remove the 2 screws from the side of the cabinet.
3. Remove the horizontal drain pan retaining bracket.
4. Carefully remove coil assembly and drain pan(s) as one assembly from the unit.

10.5 Ductwork Requirements

- Install the conditioned air plenum, ducts and air filters (not provided) in accordance with NFPA 90B Standard for the Installation of Warm Air Heating and Air-Conditioning Systems (latest edition).
- The air handler is provided with flanges for the connection of the plenum and ducts.
- Replacement air filters must be listed as Class 2 furnace air filters.
- Supply and return ductwork must be adequately sized to meet the system's air requirements and static pressure capabilities. Ductwork should be insulated with a minimum of 1" thick insulation with a vapor barrier in conditioned areas and 2" minimum in unconditioned areas.
- Supply plenum should be the same size as the flanged opening provided around the blower outlet and should extend ideally at least 3 ft. from the air handler before turning or branching off plenum into duct runs. The plenum forms an extension of the blower housing and minimizes air expansion losses from the blower.



10.6 Ductwork Installation

IMPORTANT:

- Install ductwork in accordance with local codes.
- Connect supply air duct to the flange on top of the air handler. If an isolation connector is used, it must be nonflammable.
- A return air duct system is recommended. If the unit is installed in a confined space or closet, a return connection must be run to a location outside the cabinet.

Filter Size Chart

Unit Size (MBTUH)	Filter Size
36	16" X 20"

Install Condensate Drain

The air handler is provided with ¾" NPT condensate drain connections.

A field fabricated secondary drain pan, with a drain pipe to the outside of the building, is required in all installations over a finished living space or in any area that may be damaged by overflow from the main drain pan. In some localities, local codes may require a secondary drain pan for horizontal installations. For horizontal applications make sure unit is tilted with a ¾" drop in the horizontal position towards the drain pan to ensure proper condensate drainage. The blower and coil should also be tilted ½" from back to front toward the drain line so that the drain pan will empty completely without water standing in pan.

1. Remove the appropriate drain knockouts. See "Drain Pan Connections Section". You may need to remove the indoor coil assembly from the cabinet.
2. Remove any web from inside and threaded drain pan hole to which a drain line is to be connected. Use care when removing the web so as not to damage the coil.
3. Connect primary drain line connection to the primary drain pan connection. The primary drain connection is flush with the bottom of the inside of the pan. Secondary connection is raised above the bottom of the inside of the pan.
4. Secondary drain connections, if used, should be connected to a separate drainage system. Run the secondary drain so the occupant will be able to notice if water is flowing through the secondary drain.
5. Install a 2" trap in both the primary and secondary drain lines as close to the unit as practical. Make sure the top of the trap is below the connection to the drain pan to allow complete drainage of the pan.
   NOTE: Horizontal runs must also have an anti-siphon air vent (standpipe) installed ahead of the horizontal run. See Figure 6. An extremely long horizontal run may require an oversized drain line to eliminate air trapping.

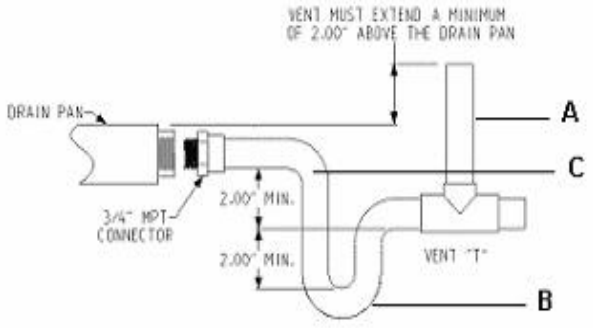


Figure 10.3 Typical condensate drain connection with A- Antisiphon Air Vent, B- Drain Trap, and C- Drain Line. Secondary drain not shown.

NOTE: Do not operate air handler without a drain trap. The condensate drain is on the negative pressure side of the blower; therefore, air being pulled through the condensate line will prevent positive drainage without a proper trap.

6. Route the drain line to the outside or to an appropriate drain. Drain lines must be installed so they do not block service access to the front of the air handler. A 24" clearance is required for filter, coil, or blower removal and service access.
   NOTE: Check local codes before connecting the drain line to an existing drainage system.
7. Insulate the drain lines where sweating could cause water damage.

Upon completion of installation, it is the responsibility of the installer to ensure the drain pan(s) is capturing all condensate, and all condensate is draining properly and not dripping into duct/system.

---

1. Pour several quarts of water into drain pan, enough to fill drain trap and line.
2. Check to make sure the drain pan is draining completely, no leaks are found in drain line fittings, and water is draining from the end of the primary drain pan.
3. Correct any leaks found.

10.6 Install Ductwork

IMPORTANT:

- Install ductwork in accordance with NFPA 90B and any local codes.
- Connect supply air duct to the flange on top of the air handler. If an isolation connector is used, it must be nonflammable.
- A return air duct system is recommended. If the unit is installed in a confined space or closet, a return connection must be run to a location outside the cabinet.

10.7 Refrigerant Line Connections

Refrigerant lines must be connected by a licensed, and certified refrigerant technician in accordance with established procedures.
IMPORTANT:

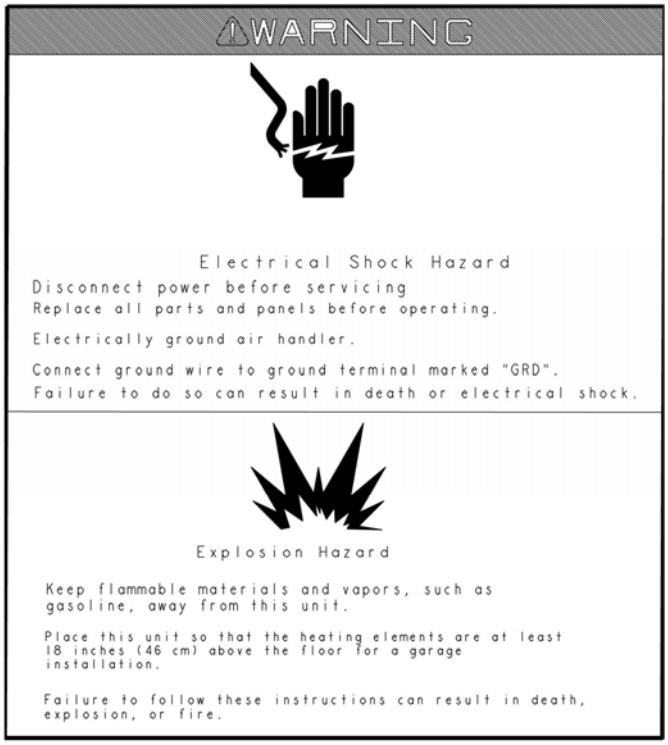
- Connecting refrigerant lines must be clean, dehydrated, refrigerant-grade copper lines. Air handler coils should be installed only with specified line sizes for approved system combinations.
- Use care with the refrigerant lines during the installation process. Sharp bends or possible kinking in the lines will cause a restriction.
- Do not remove the caps from the lines or system connection points unit connections are ready to be completed.

1. Route the suction and liquid lines from the fittings on the indoor coil to the fittings on the outdoor unit. Run the lines in a direct path, avoiding unnecessary turns and bends.
2. Ensure that both the suction and liquid line are insulated over the entire exposed length and that both suction and liquid lines are not in direct contact with floors, walls, ductwork, floor joists, or other piping.
3. Connect the suction and liquid line to the evaporator coil.
4. To avoid damaging the rubber grommets in the cabinet while brazing, slide the rubber grommets over the refrigerant lines until they are away from the heat source.
5. Braze with an alloy of silver or copper and phosphorus with a melting point above 1,100°F. **NOTE:** Do not use soft solder.
6. Reinstall the rubber grommets after brazing is finished.
7. Make sure the outdoor air conditioning unit has been put in place according to the Installation Instructions and is connected to the refrigerant lines.

10.8 Evacuation of Suction and Liquid Lines

1. Ensure the line set is evacuated using triple evacuation method to 300 microns or better.

Supply Voltage Connections



1. Disconnect all power supplies.
2. Remove the air handler access panel.
3. Route the field supply wires to the air handler electrical connection box.
4. Using UL listed wire nuts; connect the field supply wires to the air handler, black-to-black and yellow-to-yellow, as shown in Figure 8.

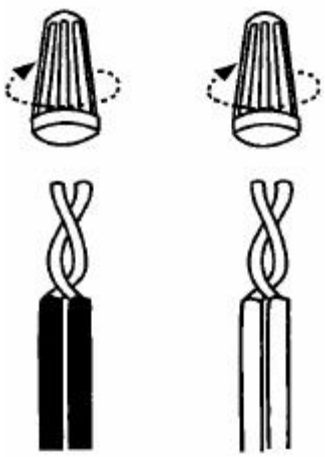
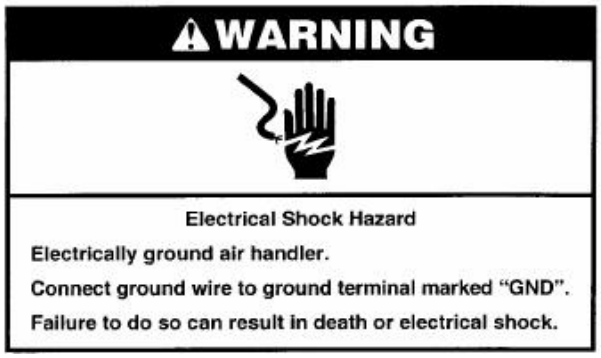
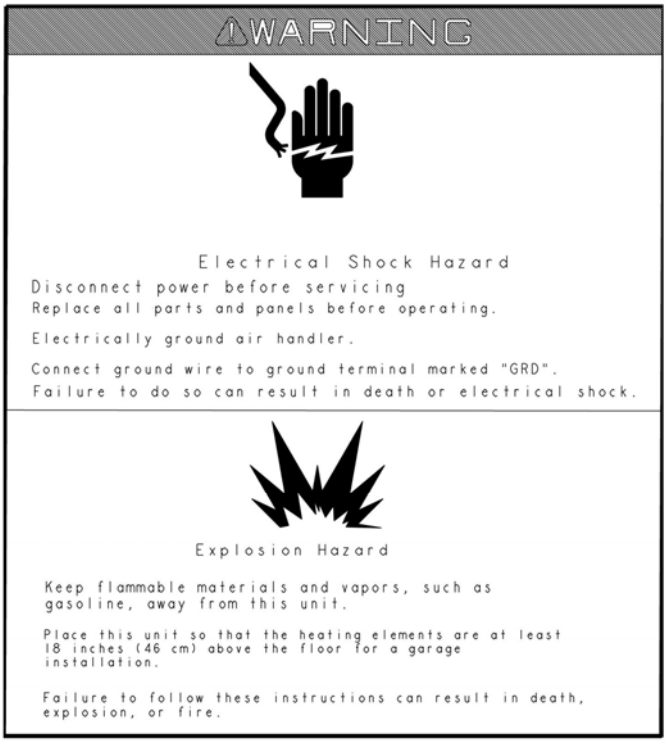


Figure 10.4. Field and Air Handler Wire Connections.



5. Connect ground wire to ground terminal marked "GND."
6. Replace the air handler access panel.

Electrical Requirements



NOTE: Use copper conductors only.

- All field wiring must be done in accordance with Canadian Electrical Code, applicable requirements of UL and local codes, where applicable.
- Electrical wiring, disconnect means and over-current protection are to be supplied by the installer. Refer to the air handler rating plate for maximum over-current protection, minimum circuit Ampacity, as well as operating voltage.
- The power supply must be sized and protected according to the specifications supplied on the product.

Electrical Connections of Control Panel

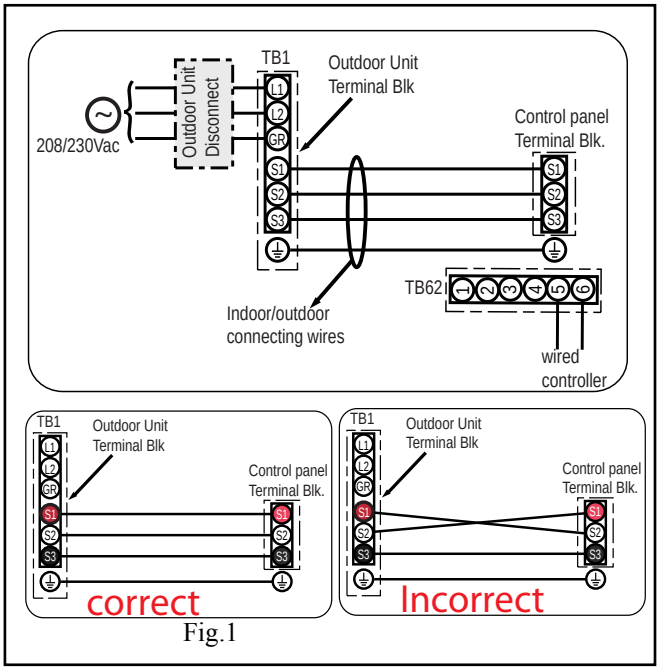
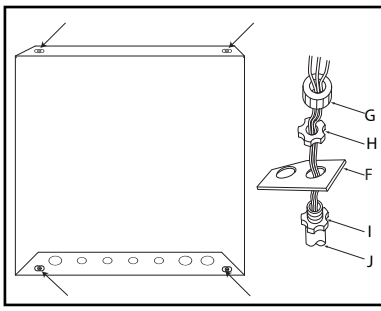


Fig.1

Remove 4 screws and slide the cover of the control panel forward (towards you)
Connect 4 wire cable to S1 S2 S3 terminal block and ground connection. The polarity of the wires should be the same as connected on the outdoor unit terminal block TB1 see fig.1 (failure to maintain correct polarity will result in incorrect operation of the system).

Note:
Please reference local electrical code and follow as instructed.



G-bush (purchased locally)
H- lock nut (purchase locally)
F- control panel
I- connector (purchase locally)
J- conduit (purchase locally)

Fig.2

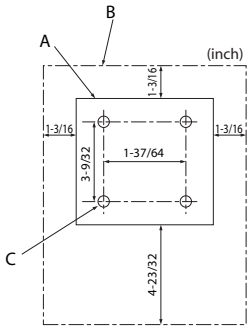
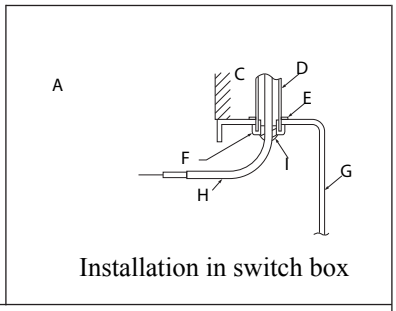


Fig. 3



Installation in switch box

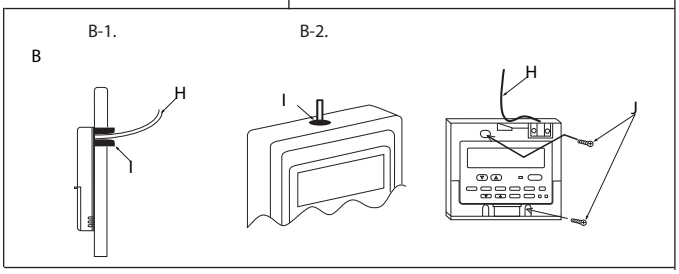


Fig. 4

Wired remote controller installation procedures:

1. Select an installing position for the remote controller. The temperature sensors are located on both remote controller and indoor unit (factory default temperature sensing from wired controller).

2. Procure the following parts locally for switch box installation:
-Two piece switch box
-Thin copper conduit tube
-Lock nuts and bushings

A. Remote controller profile
B. Required clearances surrounding the remote controller
C. Installation pitch

C- Wall
D- Conduit
E- Lock nut
F- Bushing
G- Switch box
H- Remote controller cord
I- Seal with putty
J- Wood screw

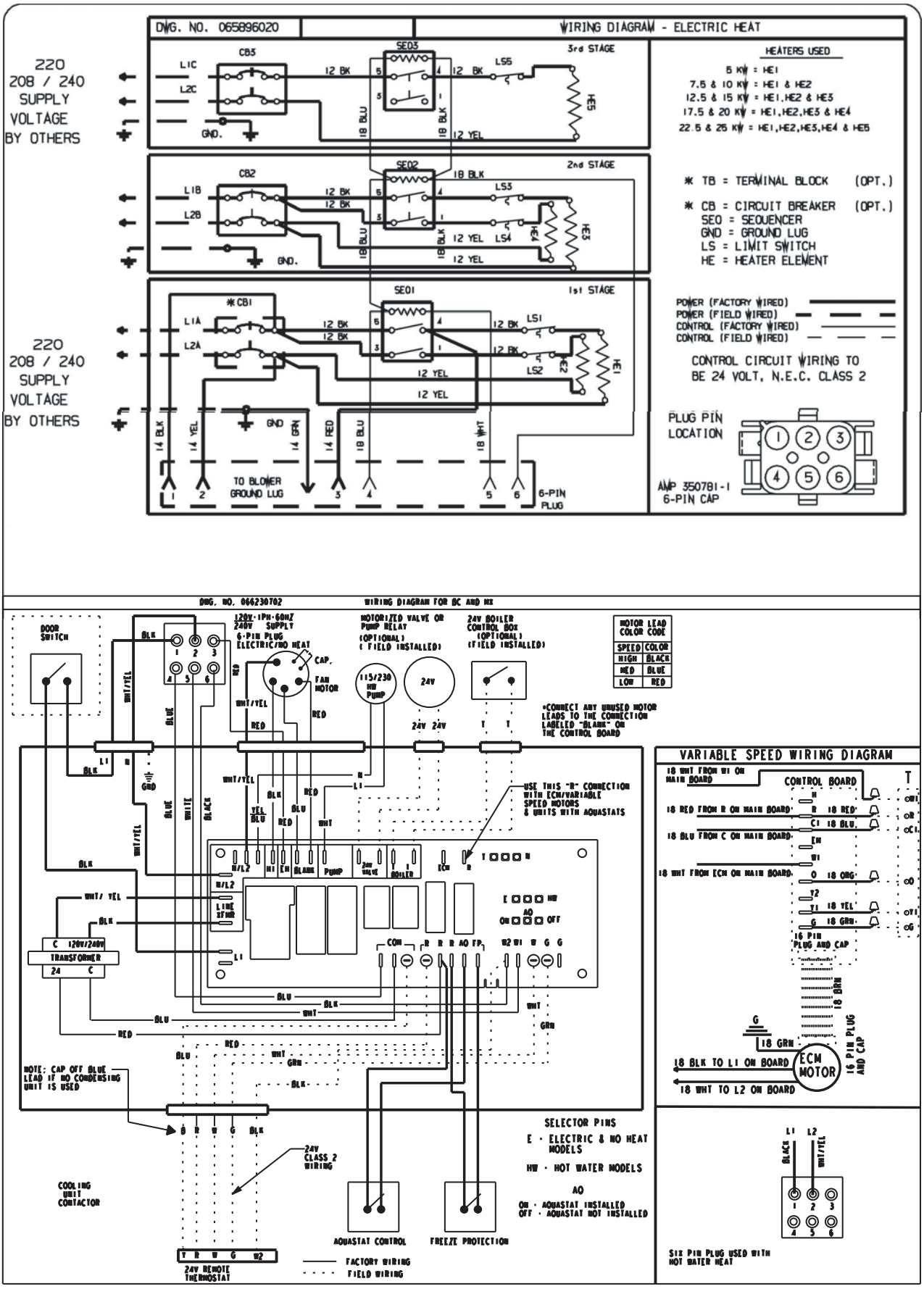
3. Prepare a hole through the wall to pass the remote controller cord (in order to run the remote controller cord from the back), then seal the hole with putty.

4. Run the remote controller cord through the cut-out upper case, then seal the cut-out notch with putty similarly as above.B-1.To lead the remote controller cord from the back of the controller:B-2.To run the remote controller cord through the upper portion:

5. Connect the wired controller cord to TB62 terminal 5 & 6 on the main interface pcb in the control panel using 18/22AWG (No polarity)

Two wired controllers setting: If two remote controllers are connected, set one to “Main” and the other to “Sub”. For setting procedures, refer to “Function selection of remote controller”

Wiring Diagram- Variable-Speed ECM Motor



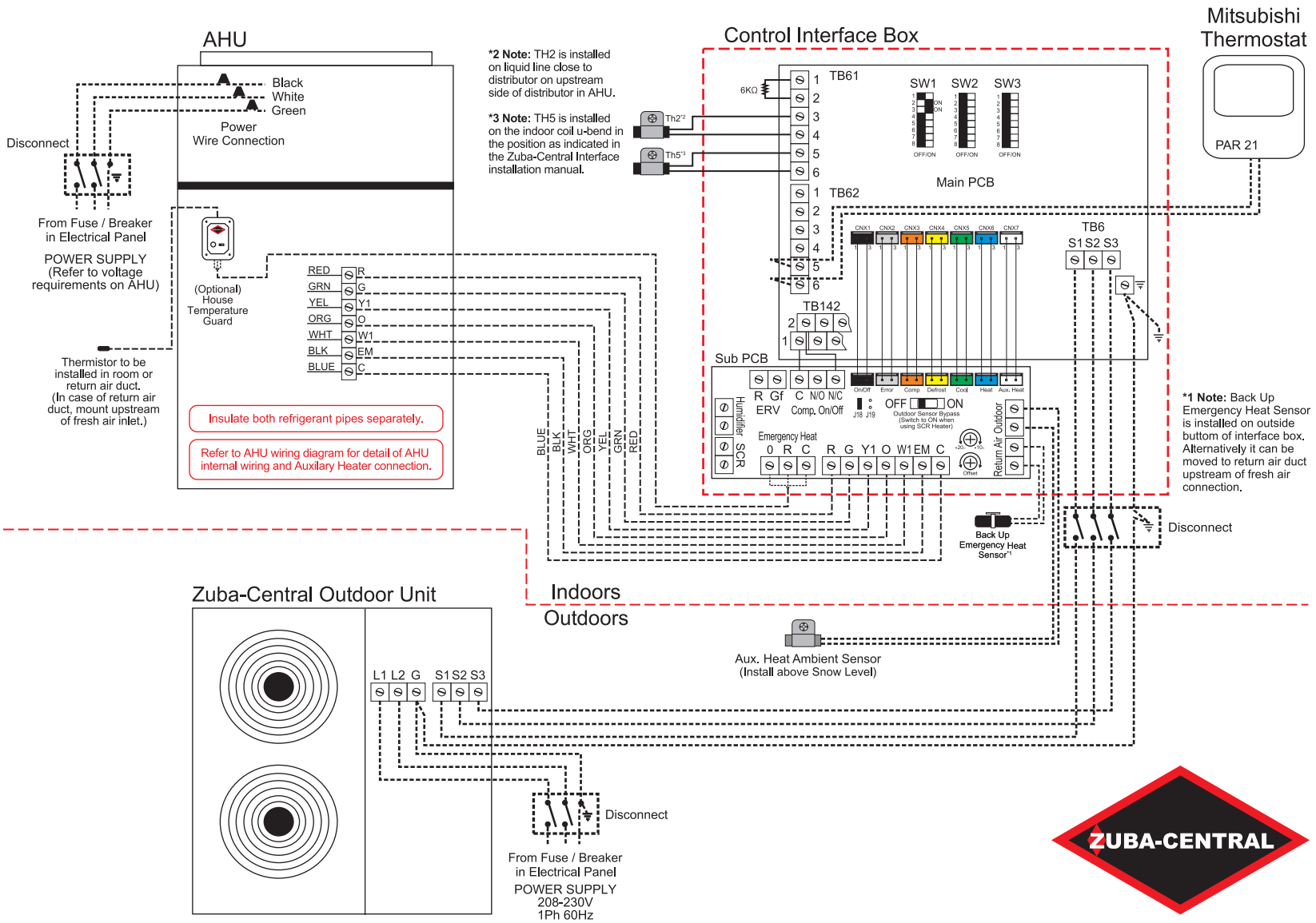
CAUTION !

This panel receives power from the outdoor unit
Be sure to switch off all power
before opening this pannel

Emergency Heat		
Standard	**Scenario**	**Control Strategy**
Auto Emergency Heat	At operation error output of microprocessor	On microprocessor error when back up emergency heat sensor*1 is colder than 20°C
With Optional House Temperature Guard	**Scenario**	**Control Strategy**
Select "Guard Mode" on House Temperature Guard	Room temperature drop below 15°C	House Temperature Guard thermistor **ON at 15°C** **OFF at 22°C**
Select "Temporary Comfort Mode" on House Temperature Guard	Room temperature drops below set temperature (°C) on House Temperature Guard's dial setting	House Temperature Guard thermistor **ON at dial setpoint minus 1°C** **OFF at dial setpoint**

External Interlocks (Sub PCB)		
Interlock Name	**Contact Type**	**Notes**
Humidifier	Voltage free relay (output)	Use field supplied transformer for humidifier control circuit, break humidifier control circuit with sub PCB voltage free contact
SCR Heater	Voltage free relay (output)	Use Sub PCB voltage free relay output to interlock the SCR control circuit
Energy Recovery Ventilator	Voltage free relay (input)	Use voltage free relay output on ERV to interlock ERV input on Sub PCB

Zuba-Central Wiring and Control Connection Diagram



11.0 Check Blower Operation

1. Turn on the ZUBA Central using the PAR21 controller.
2. The indoor blower should come on.

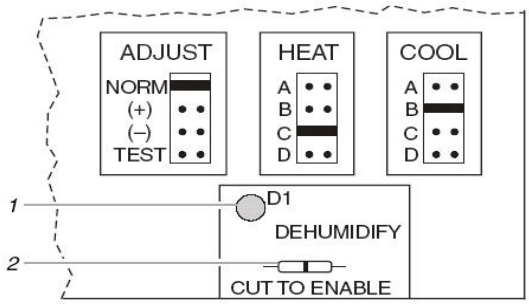
Check Airflow

Cooling blower speed

- For proper cooling operation, the airflow through the indoor coil should be between 350 and 450 CFM per ton of cooling capacity (350 - 450 CFM per 12,000 BTU/HR) based on the rating of the outdoor unit.
- The cooling blower speed is factory configured to provide correct airflow for an outdoor unit that matches the maximum cooling capacity rating of the air handler.
- If the outdoor unit is smaller than the maximum cooling capacity rating for the air handler, the cooling blower speed may need to be changed. Refer to “Blower Performance Chart.”

IMPORTANT: The cooling blower speed must be set to provide a minimum of 350 CFM airflow per ton (12,000 BTU/HR) of outdoor cooling capacity.

Control Board Taps and Dehumidify Resistor.



1. Dehumidify LED
2. Dehumidify resistor

Variable-Speed Blower Performance & Adjustment Table

Air Handler Size MBtu	Operating Mode	Thermostat Terminals X = Energized Terminal						Control Board Taps							
								Cool				Heat			
		HUM	EM	W1	O	Y2/Y1	G	A	B	C	D	A	B	C	D
								CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM
36	Cooling				X	X		1200	1000	800	600**				
	Heating					X						1200	1000	800*	600*
	Continuous Blower						X	600	500	400	350				
	Aux. Heat			X		X		***	***	***	***	1200	1000	800*	600*
	Emer. Heat		X	X				***	***	***	***	1200	1000	800*	600*

*This CFM is not approved for use with the highest kW heater size.
** This setting is not approved for cooling operation for this model.
***Airflow is the greater of the COOL and HEAT values when both electric heat and heat pump are operating.

NOTES: The heating and cooling taps are factory set on "A" Adjust tap (+) will increase airflow by 10%, while tap (-) will decrease airflow by 12%. Adjust tap "test" will cause motor to run at 70% of full airflow. Use this for troubleshooting only. At the start of a call for cooling there is a short run at 82% of airflow for 7.5 minutes. At the end of a call for cooling there is a blower off delay of 1 minute.

To change blower speed for Variable-Speed Motor: (Refer to "Wiring Diagram – Variable-Speed Motor.")

1. Disconnect all power supplies.
2. Remove the air handler access panel.
3. Locate low voltage terminal block.
4. To reduce cooling cfm by half ton, switch yellow wire on Y1 with brown wire on W2.
5. To increase cooling cfm, or for a high static application place a jumper wire between Y1 and DS.
6. Replace all panels.
7. Reconnect power.

12.0 Hydronic Coil Installation

ADP hydronic air handlers can be used with potable water systems and are shipped with or without circulating pumps. Kits are also available. Refer to pipe and pump sizing in the Air Handler's Engineering & Specification Guide for units with external pumps.

NOTICE

Copper tubing is recommended, but other approved materials are acceptable.

WARNING!

Solder joints on domestic water lines are to be made with NO-LEAD SOLDER.

NOTICE

The State of Mass requires the use of a pump timer on domestic water applications to periodically circulate water during the off cycle. This pump timer requirement is a standard factory installed feature on all B Series Air Handlers. A 50' maximum distance between water heater and air handler is also required.

NOTICE

In addition to the factory installed freeze protection on all Air Handlers with hot water coils it is recommended that water piping be insulated to prevent freezing when in unconditioned spaces such as attics, crawl spaces, or within structures that may be unoccupied during freezing conditions. Using a water-glycol solution can also help prevent pipe freezing.

Proper water heating sizing should consider both the gallon capacity AND the BTU input of the water heater.

To determine water heater gallon capacity
A minimum 40 gallon high recovery and/or high efficiency gas or oil fired water heater is recommended. The following volume-sizing guide is satisfactory in most areas.

12.1 Determine Volume

CFM	Water Heater Requirements
600-800	40 gallons
1000-1200	40 gallons
1400-1600	Either 2 -40 gallons piped together, 1 high input 50 gallon (63,000 to 75,000 Btu/hr input), or 1 –72 (or higher) gallon tank.
2000	Any combination of water heaters piped together with a total output of 105,000 Btu/hr.

12.2 Determine water heater BTU/HR input requirements.

Assume water heater recovery efficiency of 76%
BTU/HR input=
Mild climates: structure heat loss X 1.51
Cold climates: structure heat loss X 1.58

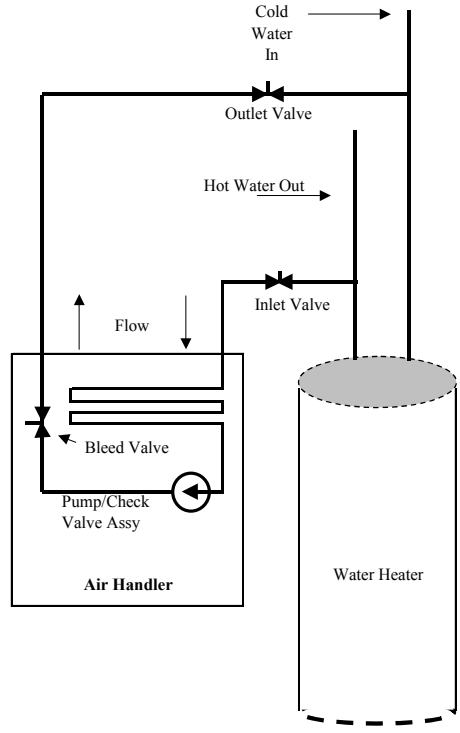


Figure 12.0 Typical installation with domestic hot water heater, many variations on external valves are possible.

12.3 Hot Water Coil Water Purging

Purge valves comes standard on all Air Handlers with factory installed circulating pumps. If utilizing an external circulating pump please make use of an external purge valve or other mechanism to purge hot water coil after installation. Take precautions while purging the Air Handler to keep the Multi-function Control Board and other electrical components from getting wet.

Close the supply valve (Inlet) and open the water return (Outlet). Manually open purge valve, use bucket or hose to discard water during purging process. Close the purge valve. Once return line is purged, close return valve (Outlet) and open supply valve (Inlet). Open bleed valve, use bucket or hose to discard water during purging process. Close purge valve.

Apply power to the fan coil. Engage pump to verify proper flow direction the right (IN) should be warmer/quicker than the left (OUT).

CAUTION

Open bleed valve while pump is running to remove any residue/deposits left from the installation process. Hot water is preferred in this process. NO CHEMICALS

CAUTION

Do not engage pump until the purge process is completed.

12.4 Maximum line lengths for AHU heating coil with built in pump

Air Handler Size MBtus	Water Coil Size	Nominal Pipe Size (ID)	GPM											
			1	1.3	1.5	1.8	2	2.3	2.5	2.8	3	3.3	3.5	3.8
36	3 Row	1/2"	-	-	-	-	53	35	23	14	8	-	-	-
		3/4"	-	-	-	-	361	263	188	152	118	89	66	48
		1"	-	-	-	-	-	-	-	-	-	461	359	280

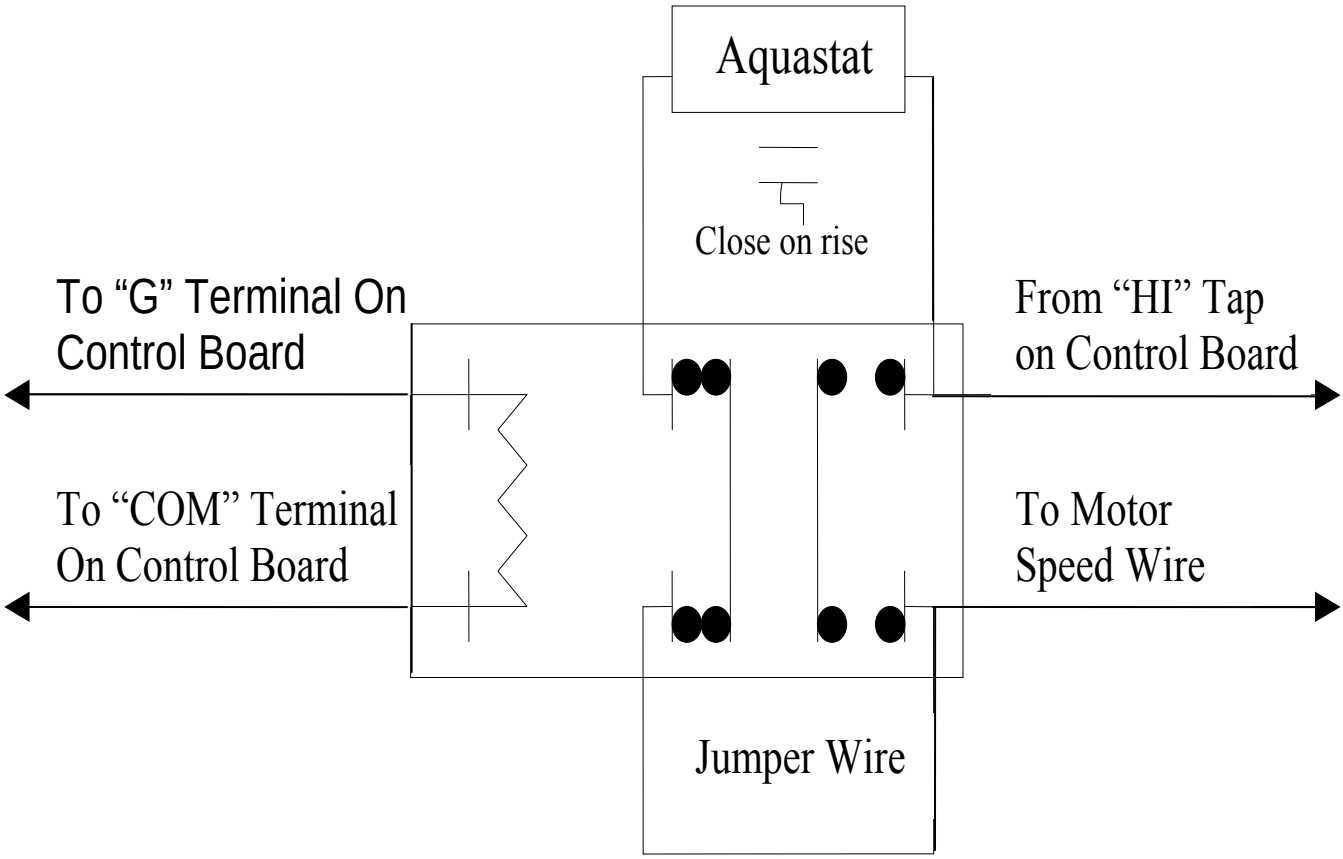
Table 1	Equivalent ft. of Pipe			
Pipe size	90˚ SR el	90˚ LR el	45˚ el	gate valve
1/2"	1.5	0.8	1	1
3/4"	2	1	1.4	1.4
1"	2.7	1.3	1.9	1.9
1 1/4"	3.6	1.8	2.5	2.5

Table 2	Fluid Temperature		
% Glycol	140˚ F	160˚ F	180˚ F
10	1.04	1.04	1.02
20	1.08	1.07	1.04
30	1.13	1.11	1.08
40	1.19	1.16	1.12
50	1.24	1.21	1.17

1. Line lengths are based on water only. To adjust maximum line lengths for glycol, divide length by the factors shown in **Table 2.**
2. **IMPORTANT:** Glycol should never be used in a potable water system.
3. All lengths are based on closed loop systems.
4. Line lengths within the shaded areas should not be used when a water heater is the source of heat. When using a boiler for these line lengths, excessive line temperature loss will occur and must be accounted for.
5. Supply and return lines must be properly insulated to reduce temperature loss and to prevent freezing when passing through an unconditioned space.
6. All lengths include (12) 90^{o} short radius elbows. To adjust for extra or fewer fittings, use the factors in **Table 1.**
7. Always use full flow ball or gate valves to minimize pressure drop.

Instructions for Field Installed Aquastats - Hot Water Heat
(See Sequence of Operations for Factory Installed Aquastat Instructions)

When selecting the proper relay (drawing below) to attach with an aquastat be sure that the relay is capable of the maximum amp draw required by the Air Handler. For all external aquastats used in conjunction with this Air Handler please follow the installation instructions provided per the manufacturer of the aquastat.



Units with Factory Installed Aquastats- The water temperature inside the hot water coil must reach 130 deg. F before the circuit between R and G are completed activating the indoor blower motor. To deactivate a factory installed aquastat simply move the selector pin on the multi-function control board (See Figure 10 pg.25) from the on position to the off position.

Units without Factory Installed Aquastats or Deactivated Aquastats- A time delay of 60 seconds follows before the circuit between R and G are complete activating the indoor blower motor. The Air Handler fan will turn off 30 seconds after the Thermostat stops calling for heating.

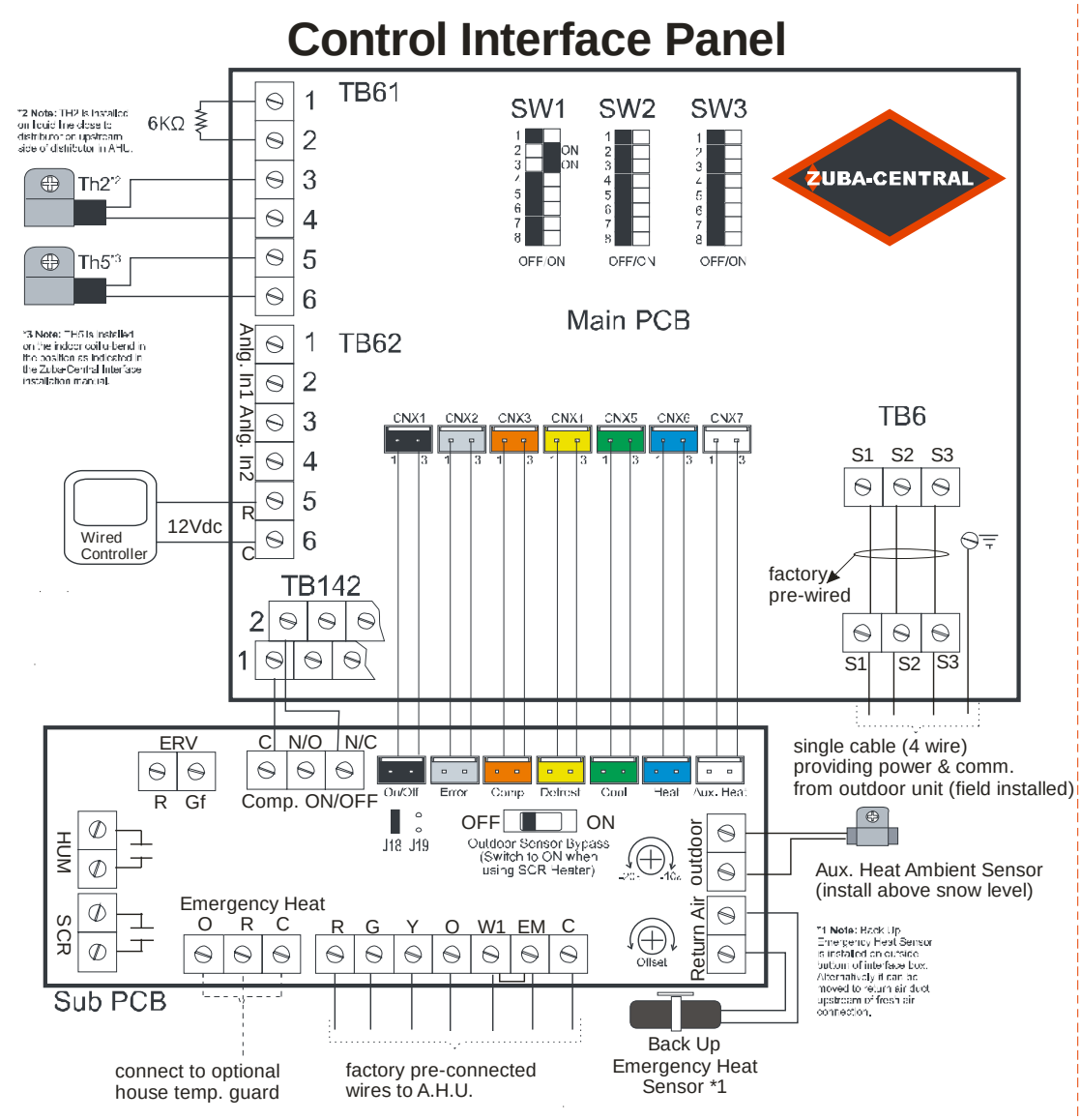
Air Handler Maintenance

At the beginning of each heating season the unit should be serviced by a qualified installer or servicing agency.

Heat Pump

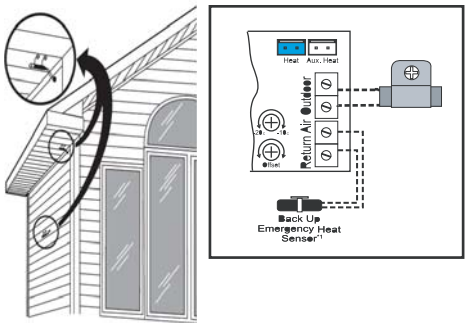
ZUBA CENTRAL
Peripheral Device Installation Manual

Block Diagram



Note:
HUM terminals are dry contacts N/O and is closed when the unit is place in heat mode.
SCR terminals are dry contacts N/O and is closed when auxiliary heat is activated.

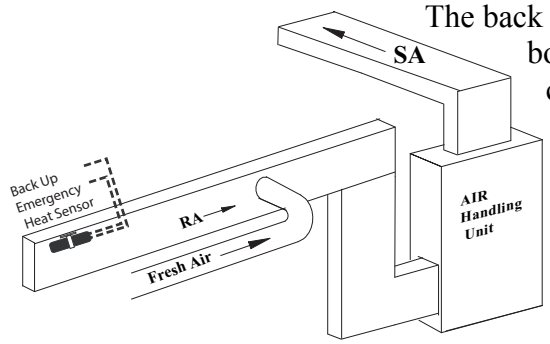
Auxiliary Heat Ambient Sensor:



The out door sensor is supplied with the control panel; mount the sensor outdoors above snow level.

The sensor leads are already connected to the sub interface pcb. Should you need to extend the supply cable, disconnect the leads from the outdoor sensor terminal of the sub interface pcb, extend the cable using 22AWG and reconnect to the outdoor sensor terminal.

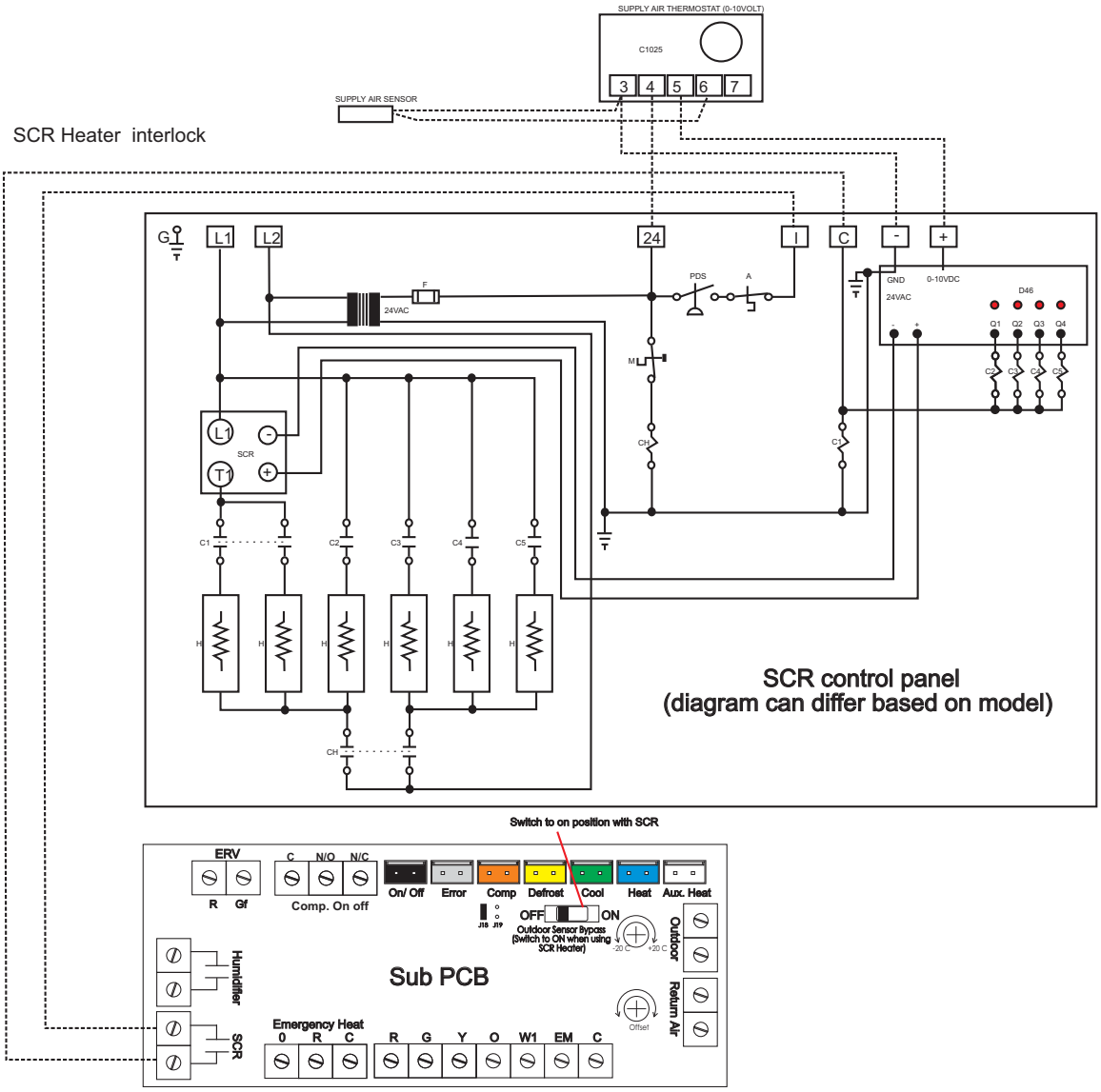
Back Up Emergency Heat Sensor:



The back up emergency heat sensor is installed on the outside bottom of the control panel. Alternatively it can be connected inside the return air duct upstream of the any fresh air connection.

SCR Interlock

The silicon controlled rectifier (SCR) regulates its heating output to maintain an air stream temperature set by the SCR controller. The air stream temperature is sensed by the sensor installed down stream of the heater and is connected to SCR controller. The use of a SCR utilizes less energy than a fixed capacity electric heater. Please reference SCR manufacture's installation manual as well as wiring diagram below when installing SCR heaters.

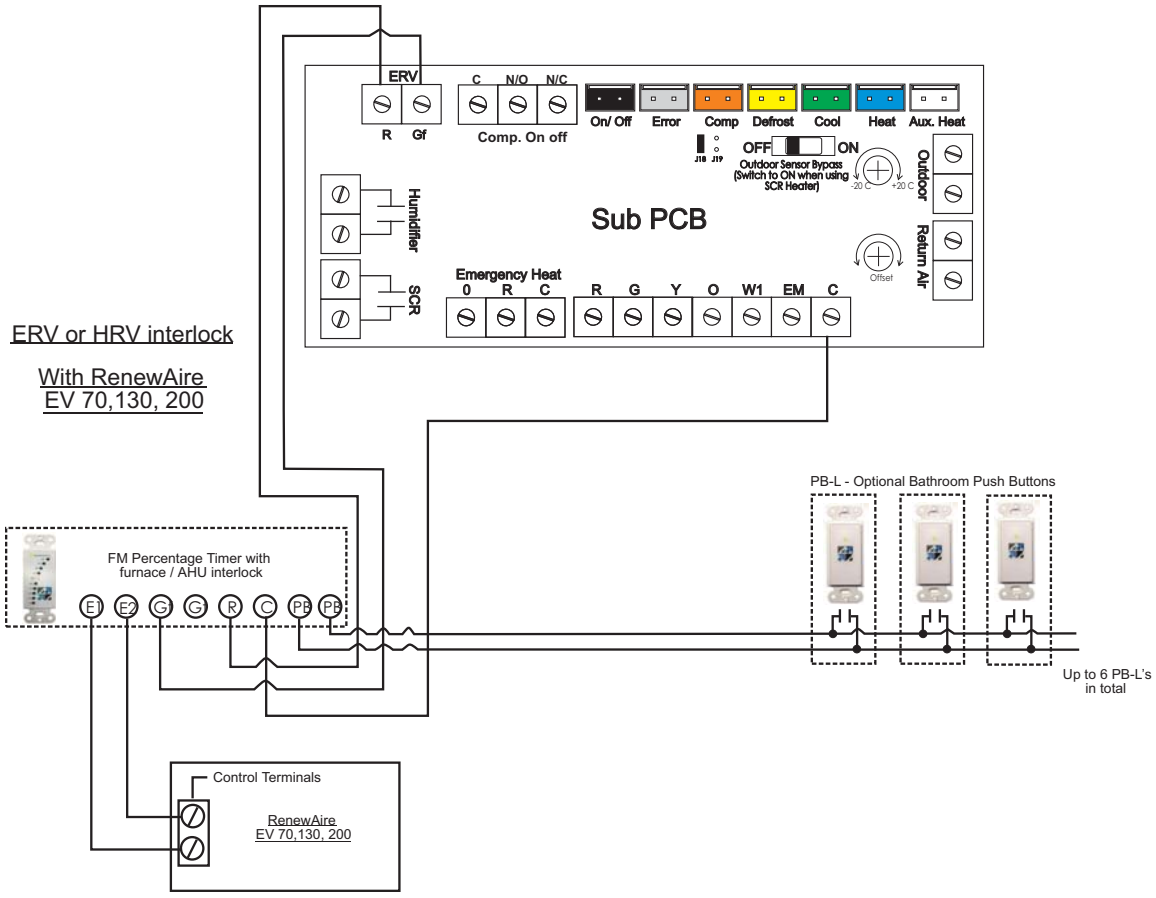


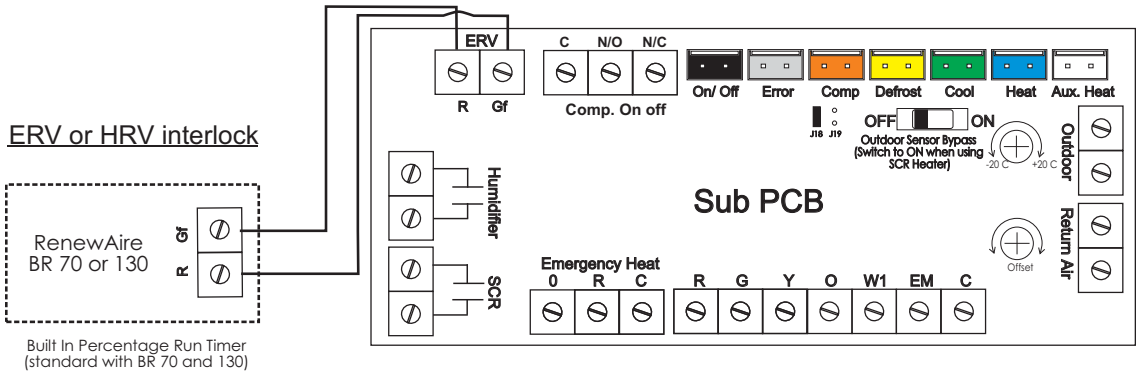
Note:
SCR terminals on the sub pcb are N/O dry contacts and are N/C during auxiliary heating operation.

Energy /Heat Recovery Ventilator

A ventilation interlock connection is available on the sub pcb that can be used to interlock the AHU circulation fan to start when ventilation is required. Should the ERV call for ventilation when the AHU unit fan is off it will activate the fan AHU fan through the ERV terminals on the sub pcb.

Please follow wiring diagram below for connection of ERV/HRV units to the AHU. The following example shows interlock with a Renewaire Energy Recovery Ventilator.

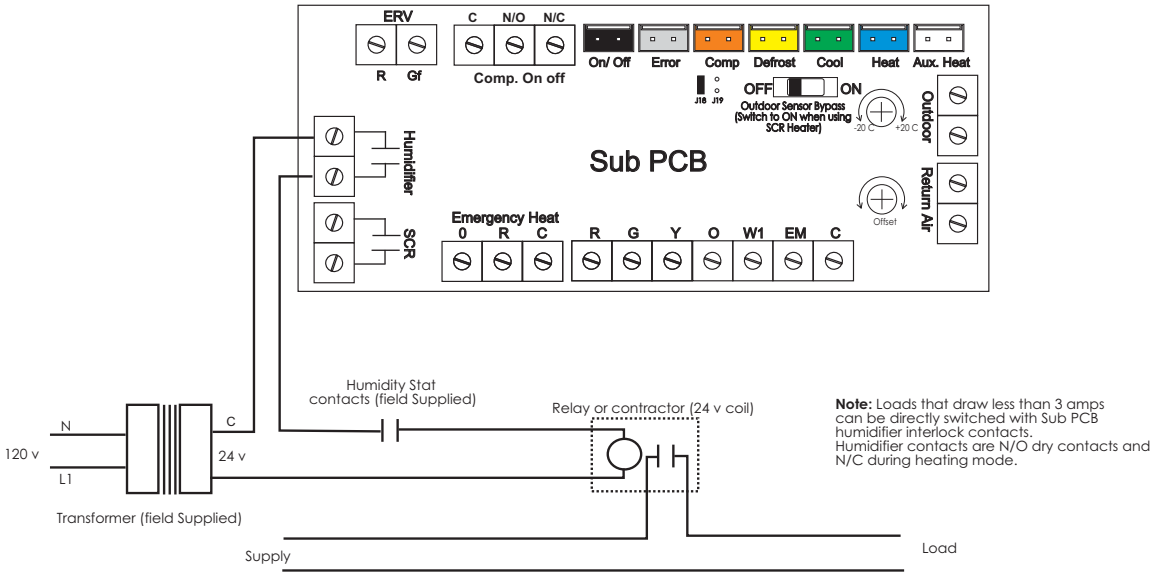




Humidifier

A humidifier interlock is available on the sub pcb, it is a voltage free normally open contact that closes when the system is in the heat mode.

The voltage free contact can support humidifier load with a max. current draw of 3 amps. Humidifier loads exceeding 3 amps should not be directly switch with this contact. Please reference wiring diagram below for humidifier electrical connection.



Optional Zuba House Temperature Guard

OptionalHouseTemperatureGuard

The optional house temperature guard can be installed and connected to the Zuba Central sub-interface pcb as shown in the drawing. This will prevent the house temperature from falling to freezing point in the event of heat pump system failure. It can be mounted on or close to the AHU, the room temperature sensor can be extended as required to a maximum length of 25 feet and mounted in any of the following places:

a) In the living space

b) In the return duct up stream of the fresh air connection, in order to measure only house return air temperature (see fig.).

c) Close to the AHU in the basement (note, the basement is normally cooler than the other living spaces, installation in this position may result in higher temperatures in living spaces other than the basement

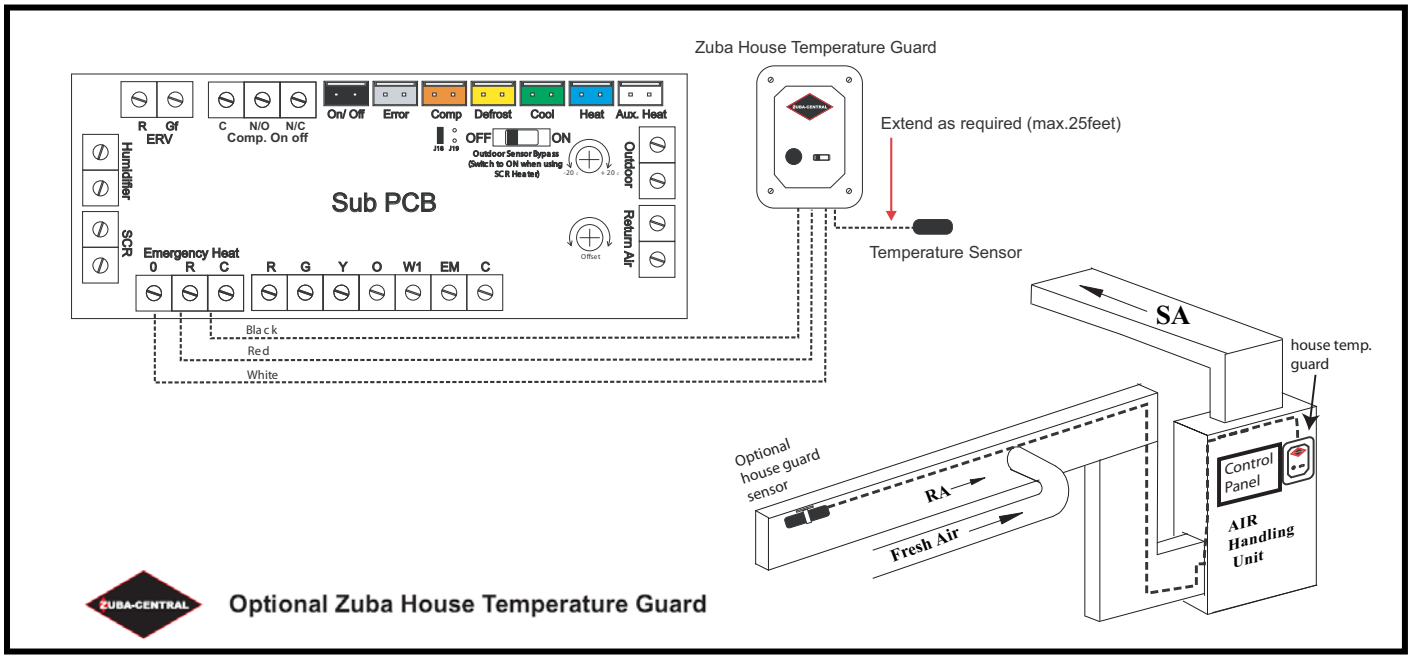
The optional house temperature guard has two settings:

- **Guard Mode:**

The mode selector switch must be selected to "guard mode" during normal operation. In the event of total heat pump system failure, should the house temperature drops to 15°C, the house temperature guard will activate the auxiliary heaters and increase the house temperature to 21°C, this provides back-up protection and comfort. During this mode the house temperature guard dial has no influence or function.

- **Temporary Comfort Mode:**

During this mode the mode the selector switch must be selected to "temporary comfort" during this selection the auxiliary heater will be controlled based on the house temperature guard dial setting such has a hysteresis of +/- 1°C. This provides temporary heat and comfort in the unlikely event of heat pump failure.



Display Change Setting

Temperature Display °F/°C Setting

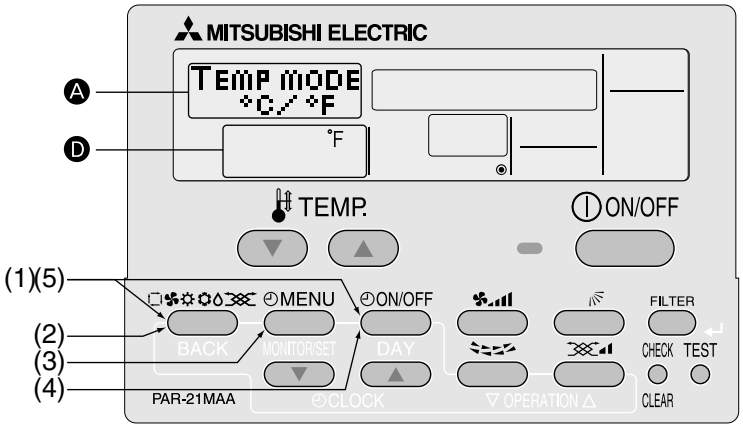
The following settings can be made.

① °F(default) : Temperatures are displayed in Fahrenheit.
(Degrees F = 1.8 × degrees C + 32)

② °C : Temperatures are displayed in Celsius.
(Degrees C = (Degrees F - 32) / 1.8)

Switching the Temperature Display Unit between °F and °C

■ Display example



(1) While pressing the MODE button, press the ON/OFF button for two seconds to activate the remote controller's function selection mode.

(2) Press the MODE button until DISP MODE SETTING appears on the screen (at Ⓐ).

[Display Ⓐ] → CHANGE LANGUAGE → FUNCTION SELECTION → MODE SELECTION → DISP MODE SETTING →

(3) Press the MENU button to select "TEMP MODE °C/°F" on the screen (at Ⓐ).

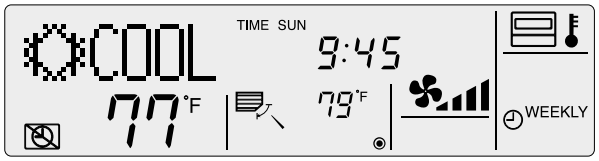
(4) Press the ON/OFF button to select "°F" or "°C"on the screen (at Ⓓ).

[Display Ⓓ] → °F → °C →

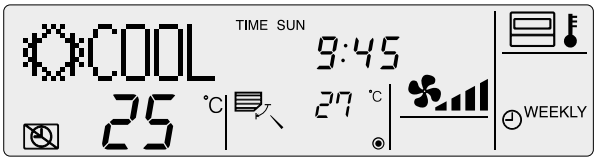
(5) While pressing the MODE button, press the ON/OFF button for two seconds to return to normal mode.

* If you press the ON/OFF button before the MODE button, the settings you have made will be cancelled.

■Temperature display example when "°F" is selected



■Temperature display example when "°C" is selected



Pre-Commissioning check list:

- Check Circuit breaker for Outdoor unit is from a separate breaker and is OFF
- Check circuit breaker for AHU unit is from a separate breaker and is OFF
- Check outdoor unit, input power wires are connected to TB1 - L1 and L2 terminals in the outdoor unit. Ensure the ground wire is connected.
- Check the input power wires from breaker panel to AHU are connected to BLACK and YELLOW wires. Ensure that the ground wire is connected.
- Check that wires from outdoor unit TB1 terminals S1, S2 and S3 are connected to Control Interface terminal block terminals S1, S2 and S3. Ensure polarity is correct and wire continuity is good.
- Check if ground wire from outdoor unit to AHU is connected.
- Confirm supply voltage to outdoor unit is from 208/230Vac single phase 60Hz source
- Confirm supply voltage to AHU is from 208/230Vac single phase 60Hz source (120 Vac single phase 60Hz. for AHU units with hydronic heat option)
- Has leak test been carried out?
- Has evacuation been carried out?
- Is insulation over refrigerant pipes correctly installed and pipes are insulated separately?
- Has drain discharge been checked?
- Confirm piping lengths and height differences between AHU and outdoor unit.
- Ensure the service valves are fully open
- If additional refrigerant is added, note added refrigerant amount on the name plate

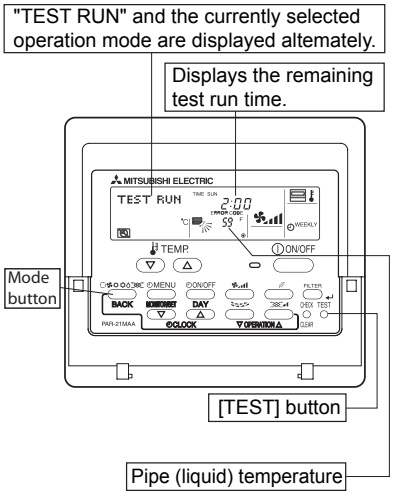
Before test run

After completing installation and the wiring and piping of the indoor and outdoorunits, check for refrigerantleakage, looseness in the power supply or controlwiring, wrong polarity, and no disconnection of one phase in the supply. Use a 500-volt megohmmeter to check that the resistance between the power supply terminals and ground is at least 1.0 M.
Do not carry out this test on the control wiring (low voltage circuit) termi-nals.

Warning:
Do not use the air conditioner if the insulation resistance is less than 1.0 M.Insulation resistance

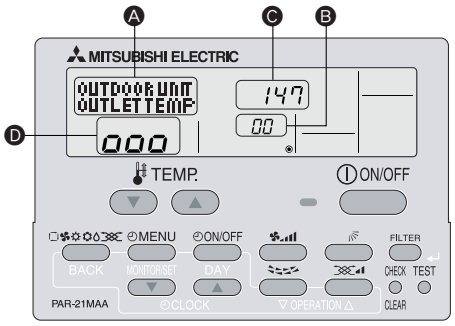
Test run Procedure:

1. Turn on the power at least 12 hours before the test run.
2. Press the [TEST] button twice. “TEST RUN” is displayed on the liquid crystal display (LCD)
3. Press the [Mode selection] button. Make sure that wind is blown out.
4. Press the [Mode selection] button and switch to the cooling (or heating) mode. Make sure that cold (or warm) wind is blown out.
5. Check operation of the outdoor unit fan.
6. Release test run by pressing the [ON/OFF] button.
7. Register a telephone number.The telephone number of the repair shop, sales office, etc., to contact if an erroroccurs can be registered in the remote controller. The telephone number will bedisplayed when an error occurs. For registration procedures, refer to the operation manual of the indoor unit.



Easy maintenance function [This function only for A-control]

Display example (Comp discharge temperature 147°F)



By using the maintenance mode, you can display many types of maintenance data on the remote controller such as the heat exchanger temperature and compressor current consumption for the indoor and outdoor units.
This function can be used whether the air conditioner is operating or not.
During air conditioner operation, data can be checked during either normal operation or maintenance mode stable operation.

* This function cannot be used during the test run.
* The availability of this function depends on the connecting outdoor unit. Refer to the brochures.

Maintenance mode operation procedures

(1) Press the TEST button for three seconds to activate the maintenance mode.
Display A: MAINTENANCE

(2) Press the TEMP. ▽ △ buttons to set the refrigerant address.
Display B: 00 ↔ 01 ····· 15

(3) Select the data you want to display.

Compressor information (MENU)
Display A: Cumulative operation time (COMP ON x10 HOURS) → ON/OFF number (COMP ON x100 TIMES) → Operation current (COMP ON CURRENT (A))

Outdoor unit information (ON/OFF)
Display A: Heat exchanger temperature (OUTDOOR UNIT H-EXC. TEMP) → Comp discharge temperature (OUTDOOR UNIT OUTLET TEMP) → Outdoor ambient temperature (OUTDOOR UNIT OUTDOOR TEMP)

Indoor unit information
Display A: Indoor room temperature (INDOOR UNIT INLET TEMP) → Heat exchanger temperature (INDOOR UNIT H-EXC. TEMP) → Filter operation time (INDOOR UNIT FILTER USE H)

* The filter operation time displayed is the number of hours the filter has been used since the filter reset was performed.

(4) Press the FILTER button.

(5) The data is displayed in C.
(Airflow temperature display example)
Display C: Flashing (Waiting for response) → Approx. 10 sec. → 147 (147°F)

* Repeat steps (2) to (5) to check another date.

(6) Press the TEST button for three seconds or press the ON/OFF button to deactivate the maintenance mode.

Stable operation

Using the maintenance mode, the operation frequency can be fixed and the operation can be stabilized. If the air conditioner is stopped, use the following procedure to start this operation.

Press the MODE button to select the operation mode.
Display A: Stable cooling operation (COOL STABLE MODE) → Stable heating operation (HEAT STABLE MODE) → Stable operation cancellation (STABLE MODE CANCEL)

Press the FILTER button.

Waiting for stable operation
Display D: 0 → 00 → 000 (10-20 min.) → Stable operation 000

* You can check the data using steps (3) to (5) of the maintenance mode operation procedures while waiting for the stable operation.

Troubleshooting

Errors Detected By Indoor Unit		
Wired Controller Error Codes	**Symptom**	**Remark**
P1	Intake sensor error	
P2,P9	Pipe (liquid or 2-phase pipe) sensor error	
E6,E7	Indoor/outdoor unit communication error	
P6	Freezing/overheating safeguard operation	
EE	Communication error between indoor and outdoor units	
P8	Pipe temperature error	
E4	Wired controller signal receiving error	
Fb	Indoor unit control system error (memory error, etc.)	
----	No corresponding	
Errors Detected By Outdoor Unit		
E9	Indoor/outdoor unit communication error (transmitting error) (outdoor unit	
UP	Compressor over current protection	
U3,U4	Open/short of outdoor unit thermistors	
UF	Compressor over current protection (when compressor locked)	
U2	Abnormal high discharge temperature, 49C open (insufficient refrigerant)	
U1,Ud	Abnormal high pressure (63H open overheating protection)	
U5	Abnormal heat sink temperature	
U8	Outdoor unit fan stop	
U6	Compressor over current protection	
U7	Abnormal super heat due to low discharge temperature	
U9, UH	High/low dc voltage from pwr. pcb, abnormal control signal from control pcb, current sensor error	
others	Reference outdoor unit service manual error code chart	

Error Display			Cause
On Wired controller		**LED1, 2 (on outdoor unit control pcb)**	
Please Wait	Displayed for 2 mins. After power on	Led 1 & 2 are lit during initial start sequence, there after led 1 stays lit	Approx. 2 mins. After power is applied operation of the wired controller is prohibited. (this is normal)
Please Wait error code	After 2 mins. Has expired following power on	LED 1 is lit then LED 1, 2 blinks	-Connector for the outdoor unit's protection device is not connected. -Reverse or open phase wiring for the outdoor unit's power terminal block (L1 L2 Gnd.)
Display message does not appear even when power on button is turned pressed		LED 1 is lit then LED1 blinks twice and LED 2 blinks once.	-Incorrect wiring between indoor and outdoor units (incorrect polarity of S1 S2 S3) -Wired controller wires shorted

Description of LED on indoor unit control pcb.	
LED1 (mirco processor 12Vdc supply)	Indicates control circuit has dc power supply (should always be on)
LED2 (wired controller 12Vdc supply)	Indicates whether 12vdc is supplied to the wired controller. This is lit only in when the controller is connect to system with refrigerant address 0
LED3 (communication between indoor & outdoor units)	When flashing indicates correct communication between indoor and outdoor unit. (should always be flashing)

LIMITED WARRANTY
Mitsubishi Electric Zuba-Central Heat Pump Systems
(This warranty replaces all previous warranties)

1. This limited warranty is provided by MITSUBISHI ELECTRIC SALES CANADA, INC. ("MESCA") only to the original owner of this Zuba-Central product (the "Product"). In order for this limited warranty to apply, the original owner must have purchased the Product from and have had it installed by a contractor who is licensed for HVAC installation under applicable provincial or federal laws in Canada and who installed the Product in accordance with (i) all applicable installation and building codes and permits, (ii) MESCA's written installation and operating instructions, and (iii) good trade practices. Subject to the foregoing and the limitations and exclusions set out below, if this Product is found to be defective in material or manufacturing workmanship, MESCA warrants that:

A. For RESIDENTIAL applications:

a) FIVE-YEAR PARTS WARRANTY. For a period of five (5) years from the date of installation of the Product, MESCA will replace or cause to be repaired, at its option, any defective part without charge for the part. The replacement parts may be new or equal to new and will be warranted to be free of defects in material and manufacturing workmanship for the remainder of the original 5-year warranty period. The defective parts must be made available to MESCA upon request in exchange for the replacement parts and become the property of MESCA.

b) ADDITIONAL TWO-YEAR COMPRESSOR WARRANTY. For a period of seven (7) years from the date of installation of the Product, MESCA will replace a defective compressor without charge for the compressor. A replacement compressor may be new or equal to new and will be warranted to be free of defects in material and manufacturing workmanship for the remainder of the original 7-year warranty period. The defective compressor must be made available to MESCA upon request in exchange for the replacement compressor and becomes the property of MESCA.

B. For COMMERCIAL applications:

a) TWO-YEAR PARTS WARRANTY. For a period of two (2) years from the date of installation of the Product, MESCA will repair or replace, at its option, any defective part without charge for the part. The replacement parts may be new or equal to new and will be warranted to be free of defects in material and manufacturing workmanship for the remainder of the original 2-year warranty period. The defective parts must be made available to MESCA upon request in exchange for the replacement parts and become the property of MESCA.

b) ADDITIONAL FIVE-YEAR COMPRESSOR WARRANTY. For a period of seven (7) years from the date of installation of the Product, MESCA will replace a defective compressor without charge for the compressor. A replacement compressor may be new or equal to new and will be warranted to be free from defects in material and manufacturing workmanship for the remainder of the original 7-year warranty period. The defective compressor must be made available to MESCA upon request in exchange for the replacement compressor and becomes the property of MESCA.

2. **LABOUR AND SERVICES NOT INCLUDED. MESCA IS SELLING THE PRODUCT ONLY AND ITS SELLING PRICE DOES NOT INCLUDE THE COST OF ANY LABOUR OR OTHER SERVICES WHICH MAY BE REQUIRED IN CONNECTION WITH THE INSTALLATION, MAINTENANCE OR SERVICING OF THE PRODUCT.** In particular, without limiting the generality of the foregoing, MESCA does not provide any inspection, diagnosis, disconnection, dismantling, service, maintenance, repair (other than in-warranty repair by or on behalf of MESCA of defective parts under this limited warranty), removal, replacement (other than the cost of providing an in-warranty replacement part or compressor), installation, services necessary to comply with local building and electrical codes, or shipment or handling of defective or replacement parts, compressor, or complete Product, nor will it be responsible for the cost thereof, whether in warranty or out-of-warranty. All services, whether in-warranty or out-of-warranty, must be arranged by the owner directly with the contractor who is contracting or has contracted with the owner to install the Product or to another authorized contractor, dealer or distributor listed on MESCA's website at www.Zuba-Central.ca and the owner will be responsible for the payment of all charges in connection therewith. Some contractors may offer their own service warranty.

3. **OWNER'S RESPONSIBILITIES.** For items that are intended to be maintained or replaced by the owner as set out in the technical documentation accompanying the Product, the owner is solely responsible for maintaining, installing, replacing, disconnecting or dismantling the Product and parts at its cost in connection with owner-required maintenance. Parts specifically excluded from this limited warranty are refrigerant, remote control units, air filters, belts, batteries, bulbs and consumables. Please consult the applicable technical documentation enclosed with the Product for information regarding recommended maintenance.

4. **IF A PROBLEM ARISES WITH THE PRODUCT DURING THE WARRANTY PERIOD,** please first review the applicable technical documentation to ensure proper installation and correct customer control adjustment for the Product. If the problem persists, contact a contractor for service as set out below:

a. Contact the contractor who installed the Product or another HVAC contractor, dealer or distributor listed on MESCA's website at www.Zuba-Central.ca and inform it of any defect in the Product within the applicable warranty time period.

b. Proof of the original date of installation of the Product by a contractor is required when requesting warranty service. Present the sales receipt, commissioning report or other document which establishes proof and date of installation. Absent such proof, this limited warranty shall be deemed to begin thirty (30) days after the date of sale of the Product by MESCA based on its sales records which shall be conclusive proof of such date of sale.

c. This limited warranty applies only while the Product remains at the site of original installation (except for mobile home installations) and only to Products installed within Canada.

5. **THIS LIMITED WARRANTY DOES NOT COVER** damage to property or personal injury, malfunction or failure of the Product, or damage to the Product or part thereof caused by or resulting from: (a) accident or negligence; (b) operation of the Product in a corrosive or wet environment containing chlorine, fluorine or any other hazardous chemicals; (c) installation, modification, alteration, repair or service by anyone other than a duly licensed and authorized contractor or other than pursuant to MESCA's instructions; (d) improper matching or application of the Product or its components; **(e) improper sizing of the Product;** (f) improper or deferred maintenance or service to the Product contrary to MESCA's instructions; (g) physical abuse or misuse of the Product (including failure to perform any maintenance as described in the Operation Manual such as air filter cleaning or replacement, or excessive physical or electrical stress); (h) operation of the Product in any manner contrary to MESCA's instructions as set out in the Installation or Operation Manual; (i) damage to or loss of the Products or parts thereof in the course of being transported or (j) acts of God or other factors such as power surge damage caused by lightning and fluctuations in or interruptions of electrical power. In addition this limited warranty will be void if any Product has had a serial number altered, defaced or removed.

6. **THIS LIMITED WARRANTY SHALL NOT BE ENLARGED**, extended or affected by, and no obligation or liability shall arise or grow out of, MESCA providing, directly or indirectly, any technical advice, information and/or service to Owner in connection with the Product.

7. **EXCEPT AS SPECIFICALLY SET OUT IN THIS LIMITED WARRANTY, MESCA MAKES NO OTHER WARRANTIES OR CONDITIONS OF ANY KIND WHATSOEVER REGARDING THE PRODUCTS. THE FOREGOING WARRANTY SETS OUT THE EXCLUSIVE RIGHTS OF THE OWNER OF THE PRODUCT AND MESCA DISCLAIMS AND EXCLUDES ALL WARRANTIES AND CONDITIONS NOT EXPRESSLY PROVIDED HEREIN AND ALL REMEDIES WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION OR OPERATION OF LAW, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY, OF QUALITY AND OF FITNESS FOR ANY PARTICULAR PURPOSE. NO ONE IS AUTHORIZED TO CHANGE THIS LIMITED WARRANTY IN ANY RESPECT OR TO CREATE ANY OTHER OBLIGATION OR LIABILITY FOR MESCA IN CONNECTION WITH ANY PRODUCT. MESCA DISCLAIMS ALL LIABILITY FOR THE ACTS, OMISSIONS AND CONDUCT OF ALL THIRD PARTIES (INCLUDING, WITHOUT LIMITATION, ANY CONTRACTORS WHO INSTALL, REPAIR, SERVICE OR MAINTAIN THE PRODUCT) IN CONNECTION WITH OR RELATED TO THE PRODUCT.**

8. **UNDER NO CIRCUMSTANCES SHALL MESCA BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES INCLUDING, WITHOUT LIMITATION, LOST GOODWILL, LOST REVENUES OR PROFITS, LOSS OF OPPORTUNITY, WORK STOPPAGE, SYSTEM FAILURE, IMPAIRMENT OF OTHER GOODS, COSTS OF REMOVAL AND REINSTALLATION OF THE PRODUCT, LOSS OF USE, INJURY TO PERSONS OR LOSS OF OR DAMAGE TO PROPERTY ARISING OUT OR RELATED TO THE PRODUCT WHETHER BASED ON BREACH OF WARRANTY, BREACH OF CONTRACT, TORT OR OTHERWISE, EVEN IF MESCA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. IN NO EVENT SHALL MESCA'S LIABILITY EXCEED THE ACTUAL PURCHASE PRICE OF THE PRODUCT WITH RESPECT TO WHICH ANY CLAIM IS MADE.**

9. Some provinces or territories may not allow certain limitations on warranties or exclusions or limitation of damages, so some of the above limitations or exclusions may not apply. This limited warranty gives the owner specific legal rights and the owner may also have other rights that vary from province to province.

10. **This Limited Warranty is valid only in Canada** and is not transferable.

MITSUBISHI ELECTRIC SALES CANADA INC.
4299 14th Avenue
Markham, Ontario L3R 0J2

Revised November 2009

Air Handler Limited Warranty – Standard 5 Year

(Applies only to product installed within the United States or Canada)

Term of Warranty: Advanced Distributor Products (ADP) warrants that products sold shall be of merchandisable quality, free of defects in material and workmanship, under normal use and service, for a period of five (5) years from the date of installation, ***not*** to exceed six (6) years from the date of manufacture. Use of this product other than in a residential application will limit the warranted term to a period of (1) year from the date of installation, not to exceed two (2) years from the date of manufacture.

Warranty Procedure: Warranty parts should be replaced by a qualified local contractor or dealer and will require the following information: model number, serial number, date of installation and an accurate description of the problem. Contractor or dealer will contact a local ADP distributor for replacement parts.

Replacement Parts: If, during the term of this warranty, a warranted part fails, ADP will either provide a replacement part free of charge, or may at its option, grant a credit for the original purchase price of the defective article to a distributor of ADP products. ADP may require the return of a defective article for factory inspection to verify and/or determine the root cause of the failure. Covered components include all parts of this unit except for the following ***excluded components***, which are not covered by this warranty: cabinet, cabinet pieces, wiring and wiring harnesses.

Care of Equipment: For this warranty to apply, ADP product must be properly installed, operated, and maintained in accordance with the installation, operation and maintenance instructions provided with each unit. Unauthorized alteration of ADP product may void this warranty.

Conditions of Warranty: Replacement parts furnished under this warranty will be warranted for the balance of the original warranty term of the unit and will not serve to extend the original term. This warranty is void if the ADP product is removed from the original installation site. This warranty does not apply to damage caused by shipping, misuse, mishandling or damage caused by floods, winds, fires, lightning, or exposure to corrosive elements/environments (such as salt, chlorine, fluorine or other damaging chemicals).

Limitations of Warranty: The costs of refrigerant, refrigerant reclamation, miscellaneous material and labor charges for diagnostics, servicing or replacing parts are not covered. ADP shall have no liability for expenses incurred for repairs without prior, written authorization from ADP.

The foregoing is in lieu of all other warranties, express or implied, not withstanding the provisions of the Uniform Commercial Code, the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, or any other statutory or common law, federal or state.

ADP makes no warranty, express or implied, of fitness for any particular purpose, or of any other nature whatsoever, with respect to products manufactured or sold by ADP hereunder, except as specifically set forth above and on the face hereof. It is expressly understood and agreed that ADP shall not be liable to buyer, or any customer of buyer, for direct or indirect, special, incidental, consequential or penal damages, or for any expenses incurred by reason of the use or misuse by buyer or third parties of said products. To the extent said products may be considered "consumer products", as defined in Sec. 101 of the Magnuson-Moss Warranty-Federal Trade Commission Improvement Act, ADP makes no warranty of any kind, express or implied, to "consumers," except as specifically set forth above on the face hereof.

This product is designed and intended for use in the residential, commercial and light-industrial environment.

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

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

CCZ-01-14-2010 Rev.D