

PTAC

AIR CONDITIONER / HEAT PUMP SERVICE MANUAL



For the following models:

208/230 VAC Units	265/277 VAC Unit
PTAC49CH3ZC PTAC49HP3ZC PTAC412CH3ZC PTAC412HP3ZC PTAC415CH3ZC PTAC415HP3ZC	PTAC49CH3VC PTAC49HP3VC PTAC412CH3VC PTAC412HP3VC PTAC415CH3VC PTAC415HP3VC

REFRIGERANT	R410A
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SAFETY PRECAUTIONS

IMPORTANT

Please Read Before Starting.

This air conditioning system meets strict safety and operating standards. As the installer or service person, it is an important part of your job to install or service the system so that it operates safely and efficiently.

To prevent injury to the user or other people and property damage, the following instructions must be followed.

- Follow each installation or repair step exactly as shown.
- Observe all local, state and national electrical codes.
- Pay close attention to all warning and caution notices given in this manual.

About the pictures:



Warning

Erroneous handling gives a high possibility to induce serious results such as death or heavy injury.



Caution

Erroneous handling may induce serious injury depending on the situation.



Warning

All electric work must be performed by licensed technician, according to local regulations and the instructions given in this manual.

- **Do not supply power to the unit until all wiring and tubing are completed or recommended and checked.**
- **Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause accidental injury or death.**
- **Ground the unit following local electrical codes.**
- **Connect all wiring tightly. Loose wiring may cause overheating at connection points and possible fire hazard.**

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

Ask your dealer or specialized subcontractor for installation or repair work.

- **Make sure the ceiling/wall is strong enough to hold the unit's weight. The outdoor unit should be installed in a location where air and noise emitted by the unit will not disturb the neighbors.**
- **Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and water damage to walls and floors.**
- **The outdoor unit must be installed on stable, level surface, in a place where there is no accumulation of**

snow, leaves or rubbish.

- **The unit should be installed according to the instructions in order to minimize the risk of damage from earthquakes, typhoons or strong winds.**
- **When the refrigerant touches the fire etc, it was decomposed and a poisonous gas is generated.**
- **Use only the specified refrigerant to charge the refrigerant circuit.**
- **Do not mix it with any other refrigerant and do not allow air to remain in the circuit.**
- **Air enclosed in the circuit can cause high pressure resulting in a rupture and other hazards.**
- **After completing installation work, make sure that refrigerant gas has not leaked.**
- **The limit density is made not to be exceeded even if the refrigerant leaks by any chance.**
- **Turn the power off at the main power box (mains) before opening the unit to check or repair electrical parts and wiring.**
- **Keep your fingers and clothing away from any moving parts.**
- **Clean up the site after you finish, remembering to check that no metal scraps of bits of wiring have been left inside the unit being serviced.**
- **The unit must be properly earth connected.**



Caution

- **Never install on the place where a combustible gas might leak.** The gas may ignite or explode when the gas leaks and collects in surround of the unit.
- **When the unit is installed at telecommunication centers or hospitals, take a proper provision against noise.**
- **When installing at a watery place, provide an electric leak breaker.**
- **Do not wash the unit with water.**
- **Be very careful about unit transportation.** The unit should not be carried by only one person if it is more than 44 LBS. It occasionally causes the damage of the unit and health to be impaired.
- **Do not touch the heat exchanger fins with your hands. Doing so may cut your hands.**
- **Do not touch the compressor or refrigerant piping without wearing glove on your hands.** Touching directly such part can cause a burn or frostbite as it becomes high or low temperature according to the refrigerant state.
- **Do not operate the air conditioner without the air filter set placed. Dust may accumulate, and cause a failure.**
- **At emergency (if you smell something burning), stop operation and turn the power source switch off.**

TECHNICAL SPECIFICATIONS

Specification of 208/230 UNITS

Model Number	PTAC49CH3ZC	PTAC49HP3ZC	PTAC412CH3ZC	PTAC412HP3ZC	PTAC415CH3ZC	PTAC415HP3ZC
AHRI Reference Number	10090937(with 2kW) 10090938(with 3kW)	10090940	10090941(with 2kW) 10090942(with 3kW) 10090943(with 5kW)	10090944	10090945(with 2kW) 10090946(with 3kW) 10090947(with 5kW)	10090948
Refrigerant type/charge	R410A / 23.6 oz	R410A / 33.9 oz	R410A / 35.3 oz	R410A / 35.3 oz	R410A / 35.3 oz	R410A / 38.8 oz
Voltage Input (V-PH-Hz)	208/230V-1-60	208/230V-1-60	208/230V-1-60	208/230V-1-60	208/230V-1-60	208/230V-1-60
Operating Temp. Range (Room temp. setting range)	61°F to 86°F	61°F to 86°F	61°F to 86°F	61°F to 86°F	61°F to 86°F	61°F to 86°F
Operating Temperature Range*	55°F to 115°F	55°F to 115°F	55°F to 115°F	55°F to 115°F	55°F to 115°F	55°F to 115°F
Cooling Capacity 208/230V (Btu/Hr)	9200 / 9400	9200 / 9400	11600 / 11800	11600 / 11800	14200 / 14500	14200 / 14500
Heating Capacity 208/230V (Btu/Hr)	N/A	8100 / 8300	N/A	10400 / 10600	N/A	13000 / 13300
Electric Heating (Watts)	3450 (power cord with LCDI plug)	3450 (power cord with LCDI plug)	3450 (power cord with LCDI plug)	3450 (power cord with LCDI plug)	3450 (power cord with LCDI plug)	3450 (power cord with LCDI plug)
Dehumidification (Pints/Hour)	2.11	2.11	2.75	2.75	3.17	3.17
EER (BTU/h.W)	12.1	12.1	11.6	11.6	10.4	10.4
COP (W/W)	N/A	3.5	N/A	3.4	N/A	3.1
AIR FLOW (H / L) CFM	330 / 294	330 / 294	341 / 306	341 / 306	341 / 306	341 / 306
Cooling Power Input (Watts)	760 / 775	760 / 775	1000 / 1015	1000 / 1015	1365 / 1390	1365 / 1390
Heating Power Input (Watts)	N/A	675 / 695	N/A	895 / 910	N/A	1225 / 1255
Rated Input (Watts)	951	951	1306	1306	1860	2162
Rated Current (A)	5.9	5.9	7.1	7.1	10.2	12
Electric Heat Current	15A	15A	15A	15A	15A	15A
Breaker Min. Size (with electric heat)	20A	20A	20A	20A	20A	20A
Compressor Brand	RECHI	RECHI	RECHI	RECHI	RECHI	RECHI
Compressor Model	44B202GK&FEKD	44B202GK&FEKD	44B262UK&FEKD	44B262UK&FEKD	44B342UL-FEKD	44B342UL-FEKD
Compressor Type	Rotary					
Compressor LRA / RLA	19.5 / 3.5	19.5 / 3.5	21.5 / 4.7	21.5 / 4.7	28.9 / 5.9	28.9 / 5.9
Compressor Power Input (W)	655	655	1005	1005	1330	1330
Outdoor Fan Motor Speed (rpm)	1340 / 1120	1340 / 1120	1550 / 1390	1550 / 1390	1550 / 1390	1600 / 1400
Outdoor Fan Motor Power Output (W)	20	20	65	65	65	65
Outdoor Fan Motor RLA	0.21	0.21	0.52	0.52	0.52	0.52
Outdoor Fan Motor Capacitor (uF)	2	2	2.5	2.5	2.5	2.5
Sound Pressure Level Max (dBa)	52 (Indoor) 61 (Outdoor)	52 (Indoor) 61 (Outdoor)	53 (Indoor) 63 (Outdoor)	53 (Indoor) 63 (Outdoor)	54 (Indoor) 64 (Outdoor)	54 (Indoor) 64 (Outdoor)
Coil Type	Aluminum fin Copper Tube					
Unit Dims (W X H X D)	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"
Package Dims (L X W X H)	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"
Net Wt. (lbs.)	113.5	117.9	117.9	120.2	119	122.4
Ship Wt. (lbs.)	133.4	137.8	137.8	140	138.9	142.2
Certifications	UL / CSA / AHRI	UL / CSA / AHRI	UL / CSA / AHRI	UL / CSA / AHRI	UL / CSA / AHRI	UL / CSA / AHRI
Design Pressure High/Low Side (PSIG)	500 / 300	500 / 300	500 / 300	500 / 300	500 / 300	500 / 300
Max. Pressure High/Low Side (PSIG)	638 / 377	638 / 377	638 / 377	638 / 377	638 / 377	638 / 377
OPTIONAL Electric Heat (Watts)	2450	2450 / 5000	2450 / 5000	2450 / 5000	2450 / 5000	2450 / 5000
Electric Heat Current	2450W - 10.7A	2450W - 10.7A	5000W - 21.8A 2450W - 10.7A	5000W - 21.8A 2450W - 10.7A	5000W - 21.8A 2450W - 10.7A	5000W - 21.8A 2450W - 10.7A
Breaker Min. Size (with electric heat)	2450W - 15A	2450W - 15A	5000W - 30A 2450W - 15A	5000W - 30A 2450W - 15A	5000W - 30A 2450W - 15A	5000W - 30A 2450W - 15A
Power Cord Part Numbers (with LCDI plug)	2KWPC230 3KWPC230	2KWPC230 3KWPC230	2KWPC230 3KWPC230 5KWPC230	2KWPC230 3KWPC230 5KWPC230	2KWPC230 3KWPC230 5KWPC230	2KWPC230 3KWPC230 5KWPC230
Optional Remote & Receiver - Part Number	425-0057					

Note: * Operating Temperature Range (outdoor), the outdoor temperature at which the unit operates normally.
If the outdoor temperature is out of this range the unit can still operate but error codes or protections may occur.

Specification of 265/277 UNITS

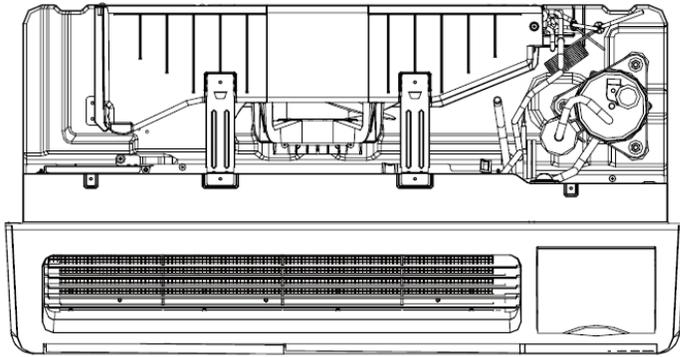
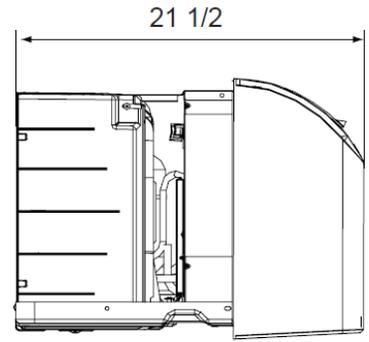
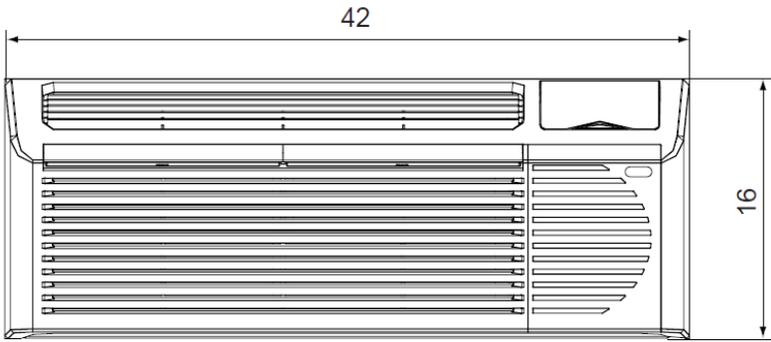
Model Number	PTAC49CH3VC	PTAC49HP3VC	PTAC412CH3VC	PTAC412HP3VC	PTAC415CH3VC	PTAC415HP3VC
AHRI Reference Number	10090949(with 2kW) 10090950(with 3kW)	10090952	10090953(with 2kW) 10090954(with 3kW) 10090955(with 5kW)	10090956	10090957(with 2kW) 10090958(with 3kW) 10090959(with 5kW)	10090960
Refrigerant type/charge	R410A / 23.6 oz	R410A / 33.9 oz	R410A / 35.3 oz	R410A / 35.3 oz	R410A / 35.3 oz	R410A / 38.8 oz
Voltage Input (V/PH/Hz)	265V/1/60	265V/1/60	265V/1/60	265V/1/60	265V/1/60	265V/1/60
Operating Temp. Range (Room temp. setting range)	61°F to 86°F	61°F to 86°F	61°F to 86°F	61°F to 86°F	61°F to 86°F	61°F to 86°F
Operating Temperature Range *	55°F to 115°F	55°F to 115°F	55°F to 115°F	55°F to 115°F	55°F to 115°F	55°F to 115°F
Cooling Capacity (Btu/Hr)	9400	9400	11800	11800	14500	14500
Heating Capacity (Btu/Hr)	N/A	8300	N/A	10600	N/A	13300
Electric Heating (Watts)	3450	3450	3450	3450	3450	3450
Dehumidification (Pints/Hour)	2.11	2.11	2.75	2.75	3.17	3.17
EER (BTU/h.W)	12.1	12.1	11.6	11.6	10.4	10.4
COP (W/W)	N/A	3.5	N/A	3.4	N/A	3.1
MOP. (A)	20 (optional 15A)	20 (optional 15A)	20 (optional 15A/25A)	20 (optional 15A/25A)	20 (optional 15A/25A)	20 (optional 15A/25A)
MCA. (A)	17 (optional 12A)	17 (optional 12A)	17 (optional 12A/24A)	17 (optional 12A/24A)	17 (optional 12A/24A)	17 (optional 12A/24A)
AIR FLOW (H / L) CFM	330 / 294	330 / 294	341 / 306	341 / 306	341 / 306	341 / 306
Cooling Power Input (Watts)	775	775	1015	1015	1390	1390
Heating Power Input (Watts)	N/A	695	N/A	910	N/A	1255
Rated Input (Watts)	951	951	1264	1264	1684	1684
Rated Current (A)	4.2	4.2	5.17	5.17	7.1	7.1
Electric Heat Current	13.1A	13.1A	13.1A	13.1A	13.1A	13.1A
Breaker Min. Size (with electric heat)	20A	20A	20A	20A	20A	20A
Compressor Brand	RECHI	RECHI	RECHI	RECHI	PANASONIC	PANASONIC
Compressor Model	44B207GK&FEKD	44B207GK&FEKD	44B267HK&FEKD	44B267HK&FEKD	5PS136LCA21	5PS136LCA21
Compressor Type	Rotary					
Compressor LRA / RLA	13.5 / 3	13.5 / 3	19 / 3.9	19 / 3.9	26 / 5.1	26 / 5.1
Compressor Power Input (W)	645	645	1010	1010	1320	1320
Outdoor Fan Motor Speed (rpm)	1340 / 1120	1340 / 1120	1550 / 1380	1550 / 1380	1550 / 1380	1550 / 1380
Outdoor Fan Motor Power Output (W)	20	20	45	45	45	45
Outdoor Fan Motor Capacitor (uF)	1.5	1.5	2	2	2	2
Outdoor Fan Motor RLA	0.16	0.16	0.31	0.31	0.31	0.31
Outdoor Fan Motor FLA	0.3	0.3	0.4	0.4	0.4	0.4
Indoor Fan Motor FLA	0.18	0.18	0.2	0.2	0.2	0.2
Sound Pressure Level Max. (dBa)	52 (Indoor) 61 (Outdoor)	52 (Indoor) 61 (Outdoor)	53 (Indoor) 63 (Outdoor)	53 (Indoor) 63 (Outdoor)	54 (Indoor) 64 (Outdoor)	54 (Indoor) 64 (Outdoor)
Coil Type	Aluminum fin Copper Tube					
Unit Dims (W X H X D)	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"	42.1" x 16" x 21.5"
Package Dims (L X W X H)	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"	45.2" x 25.7" x 18.5"
Net Wt. (lbs.)	113.5	117.9	116.8	117.9	119	120.2
Ship Wt. (lbs.)	133.4	137.8	136.7	137.8	138.9	142.2
Certifications	UL / CSA / AHRI	UL / CSA / AHRI	UL / CSA / AHRI	UL / CSA / AHRI	UL / CSA / AHRI	UL / CSA / AHRI
Design Pressure High/Low Side (PSIG)	500 / 300	500 / 300	500 / 300	500 / 300	500 / 300	500 / 300
Max. Pressure High/Low Side (PSIG)	638 / 377	638 / 377	638 / 377	638 / 377	638 / 377	638 / 377
OPTIONAL Electric Heat (Watts)	2450	2450	2450 / 5000	2450 / 5000	2450 / 5000	2450 / 5000
Electric Heat Current	2450W - 9.3A	2450W - 9.3A	5000W - 18.9A 2450W - 9.3A	5000W - 18.9A 2450W - 9.3A	5000W - 18.9A 2450W - 9.3A	5000W - 18.9A 2450W - 9.3A
Breaker Min. Size (with electric heat)	2450W - 15A	2450W - 15A	5000W - 25A 2450W - 15A	5000W - 25A 2450W - 15A	5000W - 25A 2450W - 15A	5000W - 25A 2450W - 15A
Power Cord Part Numbers	2KWPC277 3KWPC277	2KWPC277 3KWPC277	2KWPC277 3KWPC277 5KWPC277	2KWPC277 3KWPC277 5KWPC277	2KWPC277 3KWPC277 5KWPC277	2KWPC277 3KWPC277 5KWPC277
Optional Remote & Receiver - Part Number	425-0057					

Note: * Operating Temperature Range (outdoor), the outdoor temperature at which the unit operates normally.

If the outdoor temperature is out of this range the unit can still operate but error codes or protections may occur.

All specifications given at 265 VAC.

OUTLINE AND INSTALLATION DIMENSION

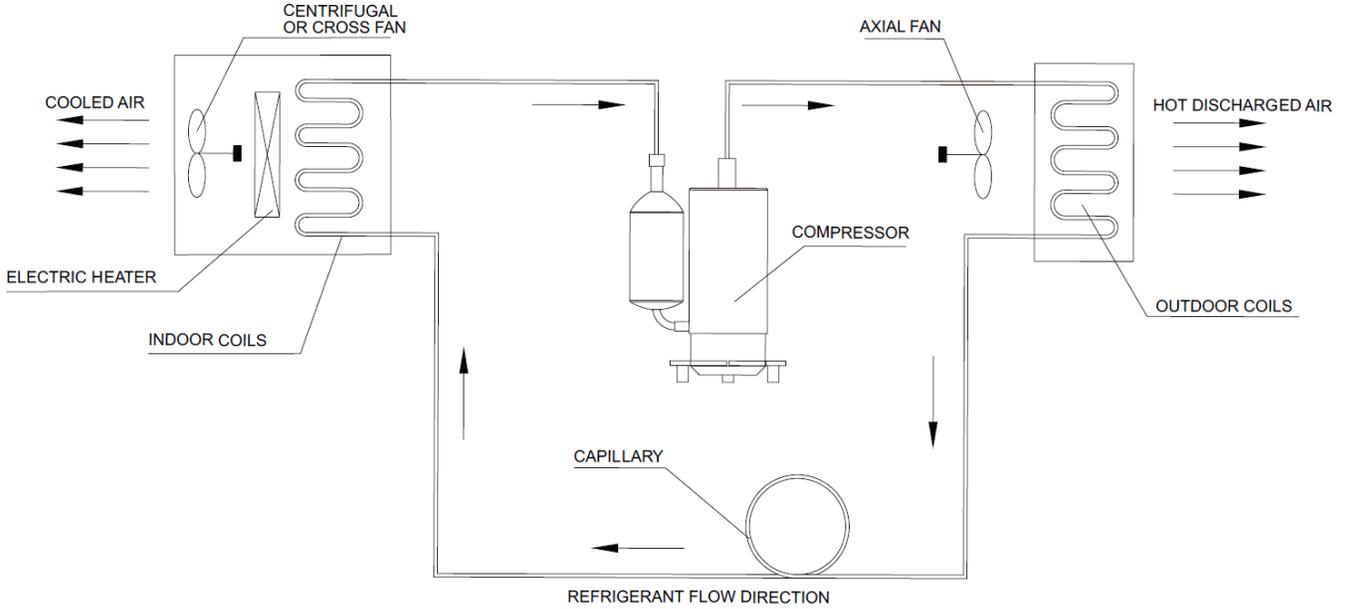


Unit:inch

REFRIGERATION SYSTEM DIAGRAM

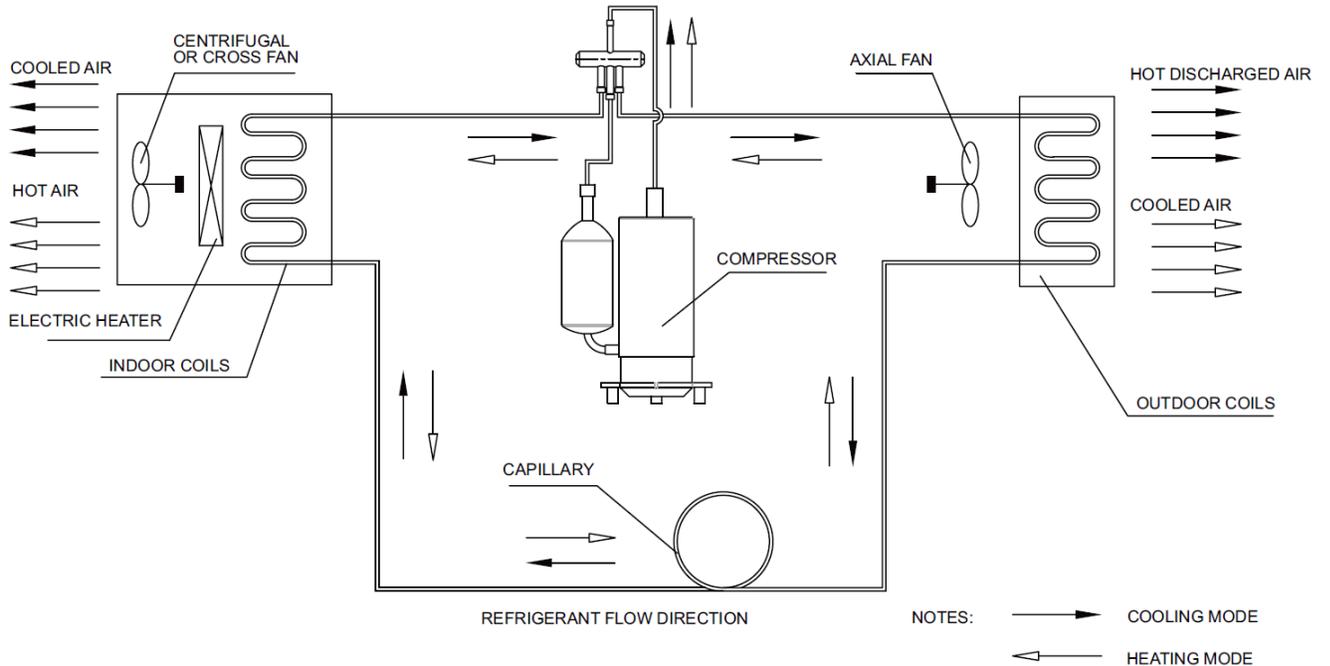
Air Conditioner with Electric Heat units

Model: PTAC49CH3ZC, PTAC49CH3VC, PTAC412CH3ZC, PTAC412CH3VC, PTAC415CH3ZC, PTAC415CH3VC



Heat Pump with Electric Heat units

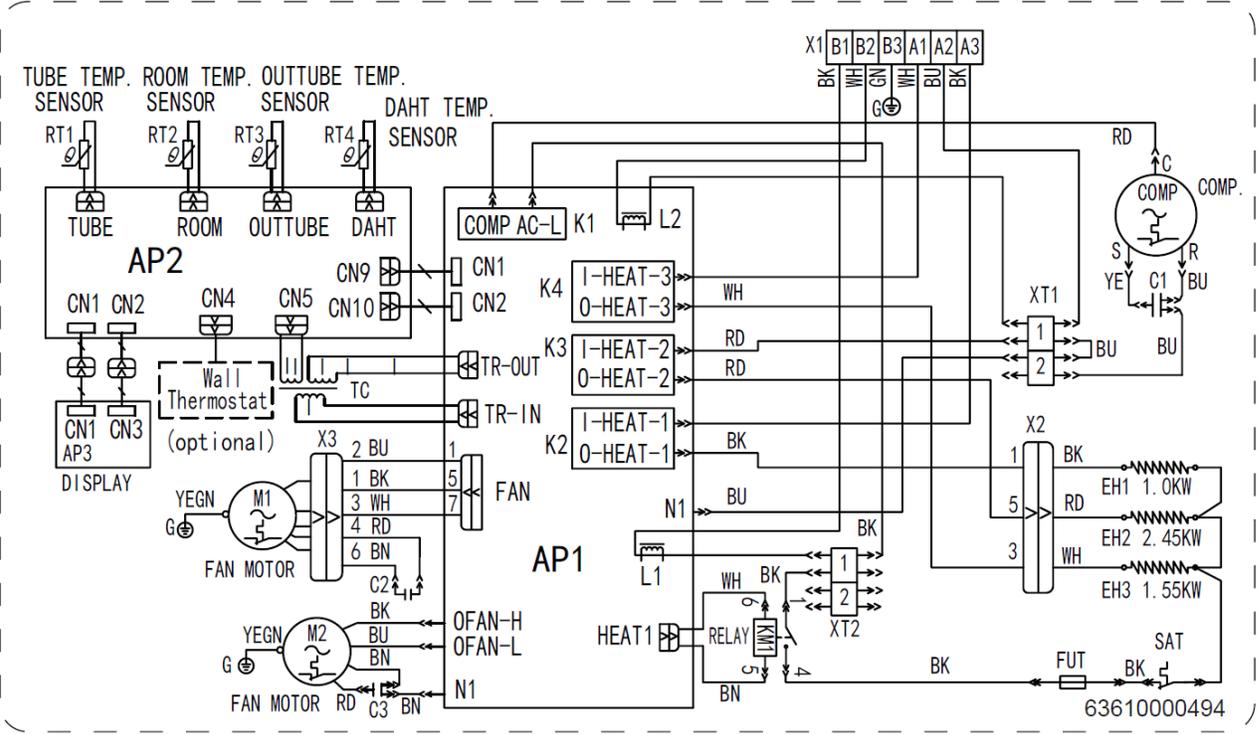
Model: PTAC49HP3ZC, PTAC49HP3VC, PTAC412HP3ZC, PTAC412HP3VC, PTAC415HP3ZC, PTAC415HP3VC



WIRING DIAGRAM

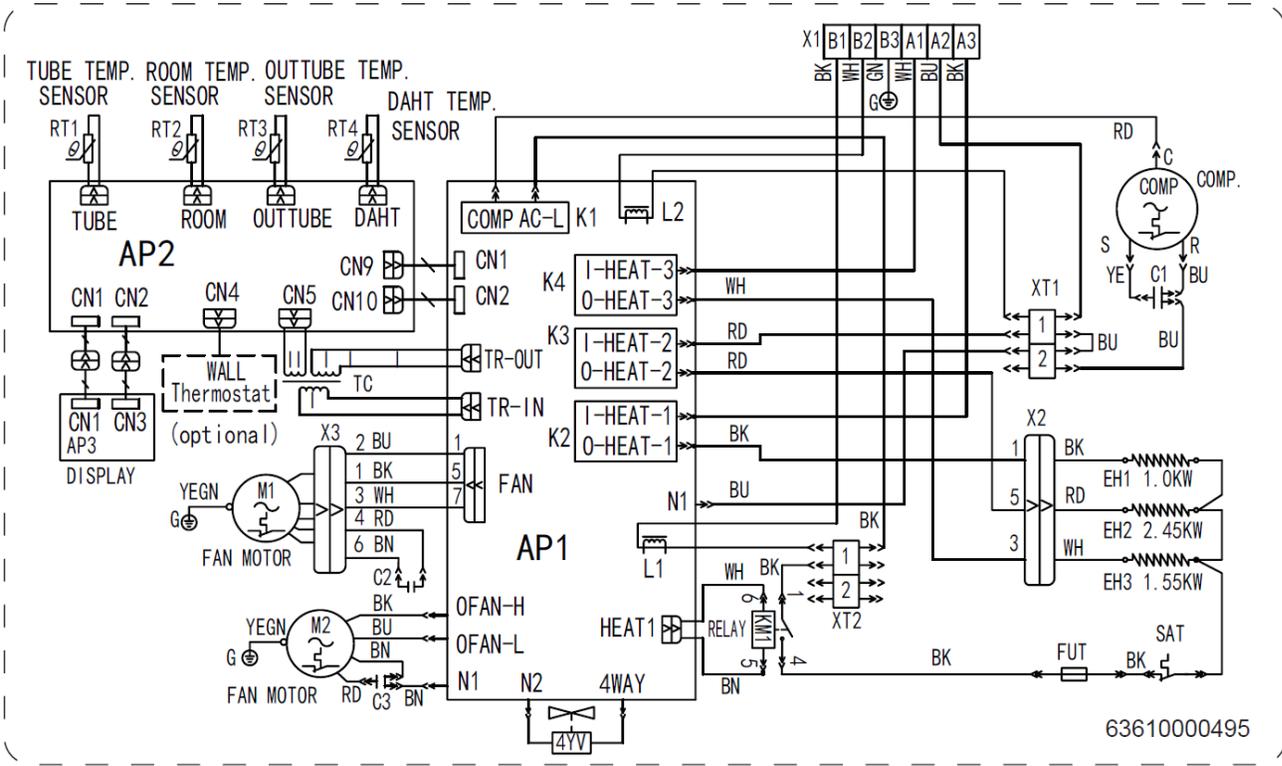
Air Conditioner with Electric Heat units

Model: PTAC49CH3ZC, PTAC49CH3VC, PTAC412CH3ZC, PTAC412CH3VC, PTAC415CH3ZC, PTAC415CH3VC



Heat Pump with Electric Heat units

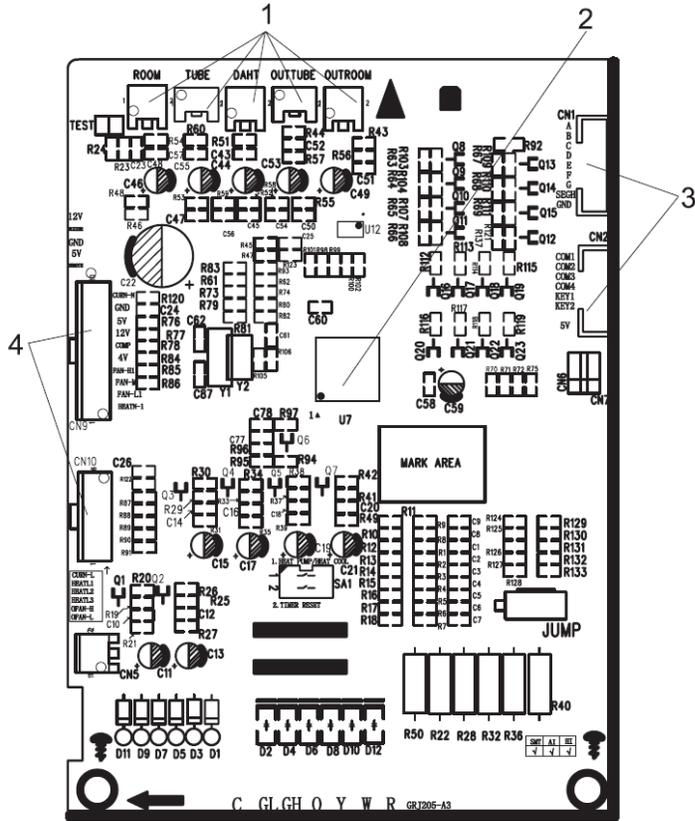
Model: PTAC49HP3ZC, PTAC49HP3VC, PTAC412HP3ZC, PTAC412HP3VC, PTAC415HP3ZC, PTAC415HP3VC



PC BOARD

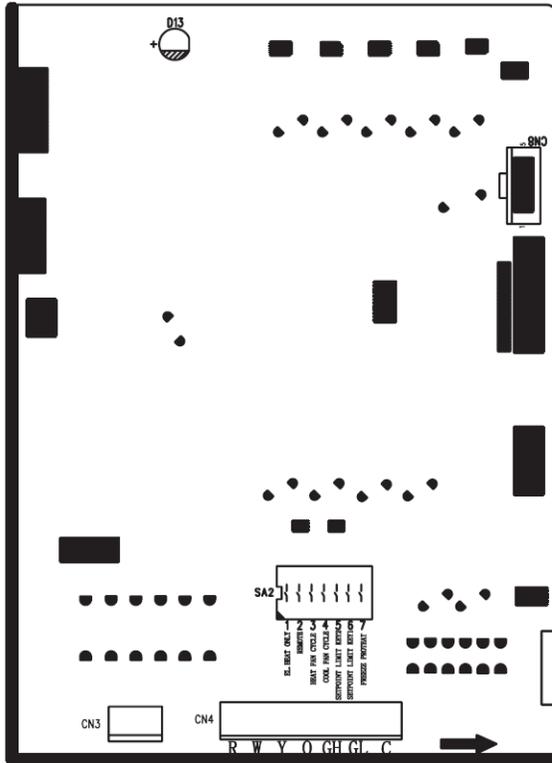
Main Board 1

Top View



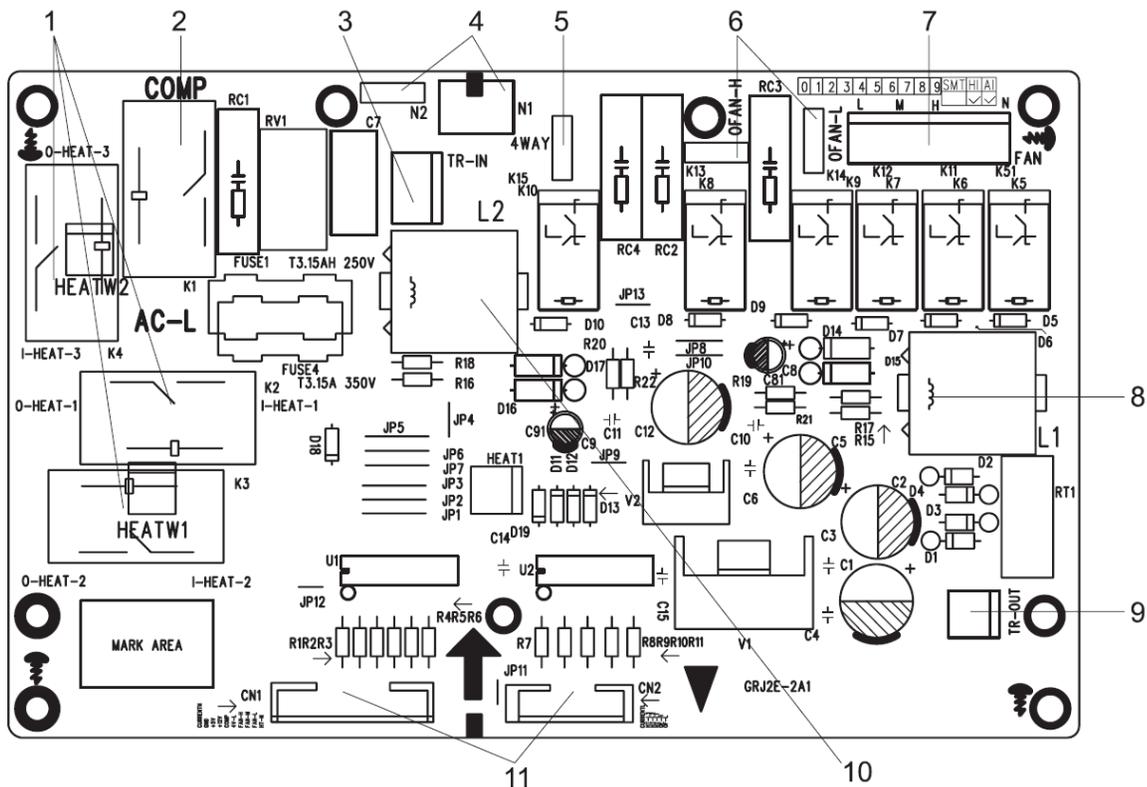
1	Terminal of temperature sensor
2	Main chip
3	Interface of display
4	Interface of main board

Bottom View



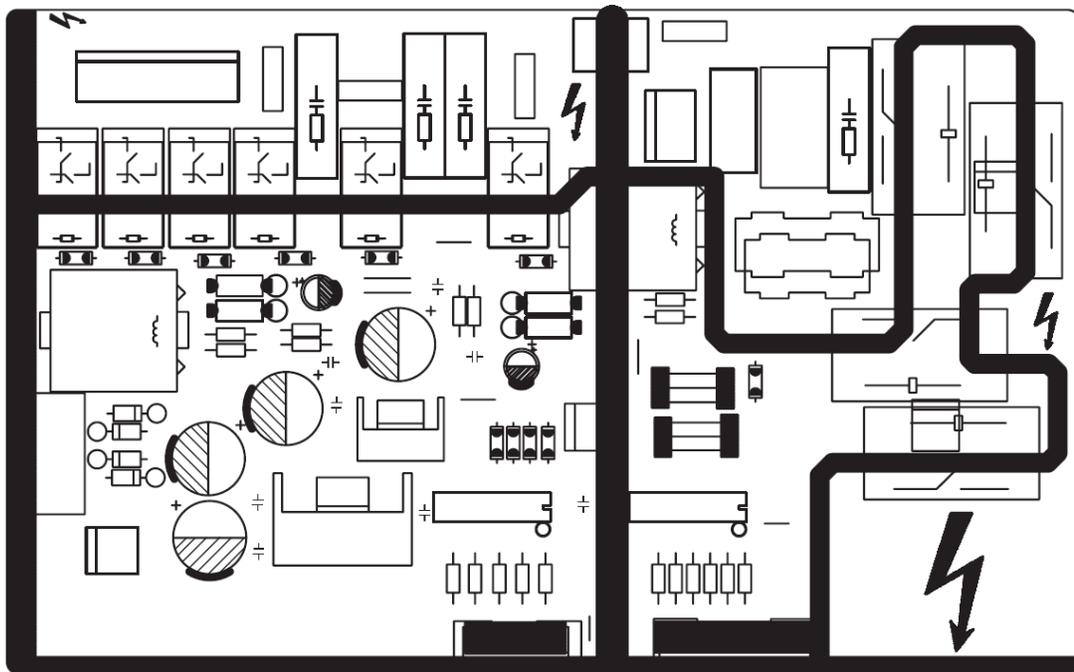
Main Board 2

Top View



1	Relay of electric heating	5	Terminal of 4-way valve	9	Terminal of transformer
2	Relay of compressor	6	Terminal of outdoor fan	10	Current inductor
3	Terminal of transformer	7	Terminal of indoor fan	11	Interface of main board
4	Neutral wire interface	8	Current inductor	12	/

Bottom View



INSTALLATION INSTRUCTIONS

Proper installation is the responsibility of the installer. Product failure due to improper installation is not covered under the Warranty.

CHASSIS INSTALLATION

Units are shipped without a sleeve. In applications where unit is a replacement, it is recommended that a Sea Breeze sleeve be used.

These units can retrofit General Electric, Amana, Trane, and Friedrich sleeves / grilles (be sure outdoor grille is installed on the sleeve). See Table 1 for details.

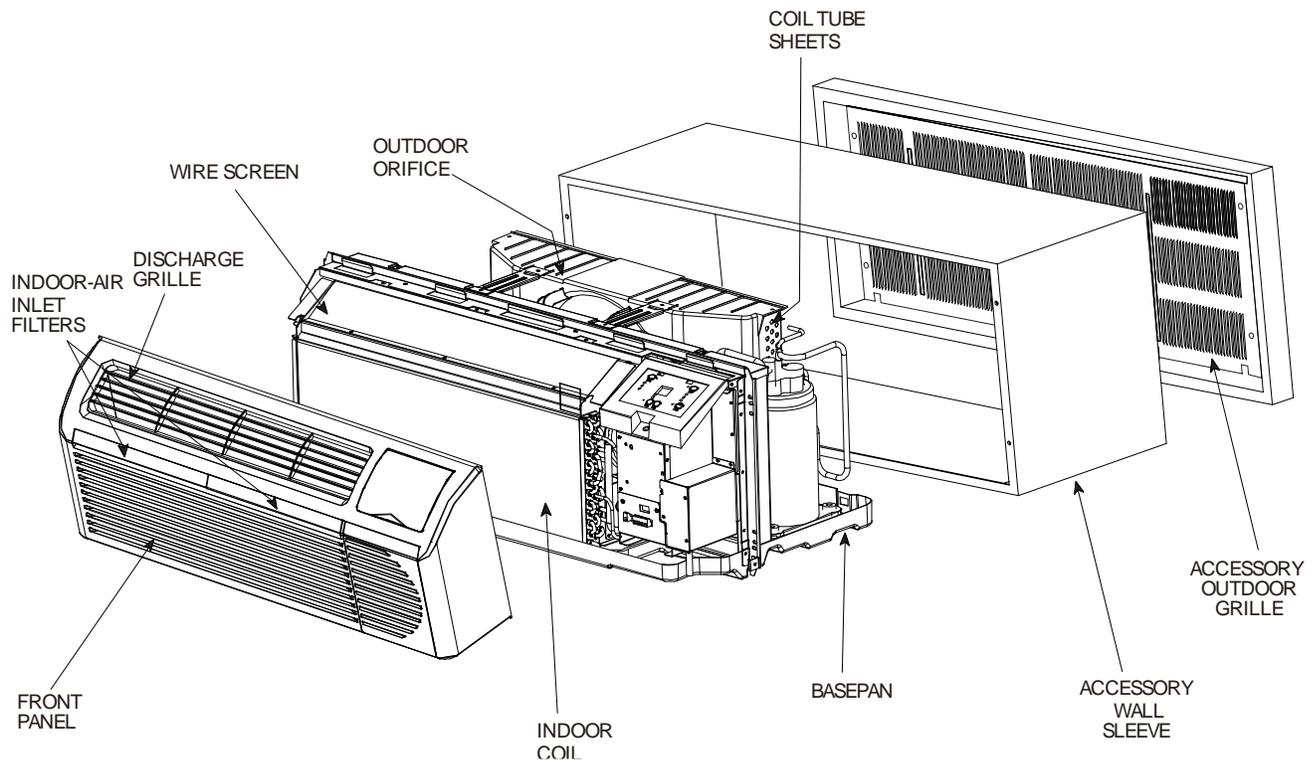
For any sleeve retrofit applications, be sure that the foam seals (factory-installed on the tube sheets) provide a good seal between the grille and outdoor coil tube sheet. These foam seals provide a barrier to separate outdoor coil leaving air from mixing with the outdoor incoming air (known as air recirculation).

	CAUTION
<p>UNIT DAMAGE AND/OR OPERATION HAZARD Failure to follow this caution may result in equipment damage or improper operation. For retrofit applications, foam seals on outdoor coil tube sheets must make a seal between the coil and grille or loss of performance and premature damage to the major components can result.</p>	

Table 1 – Retrofit Wall Sleeves

Manufacturer	Wall Sleeve Part Number
General Electric	Metal Sleeve RAB72
	Plastic Sleeve RAB77
Amana	Metal Sleeve WS900B
Trane	Metal Sleeve SLV149
Friedrich	T-Series Metal 11 ^{1/2} - in. Deep Wall Sleeve*
	Standard Depth Wall Sleeve 16 x 42 x 13 ^{3/4} - in. PXWS

* FR - SLEEVE-EXT accessory is required for retrofit into Friedrich (T-Series) wall sleeves.



RETROFIT SLEEVE PREPARATION

IMPORTANT: Inspect wall sleeve thoroughly prior to installation. Manufacturer does not assume responsibility for costs or damages due to defects in sleeve or for improper installation.

	<h1>WARNING</h1>
ELECTRICAL SHOCK HAZARD	
Failure to follow this warning could result in personal injury or death.	
Disconnect all power to unit to avoid possible electrical shock during installation.	

Remove any existing foam baffles that are installed on competitive outdoor grille, if present. See Fig.1

GE Sleeves Only

GE Metal Wall Sleeve - Remove metal clip on mounting rail located on left, inside bottom, of metal sleeve and discard. See Fig. 2.

GE Plastic Sleeve - Remove bottom seal from plastic sleeve. See Fig. 3.

INSTALLATION OF A CARRIER WALL SLEEVE USING A NON CARRIER GRILLE

This application has become more common due to pre-manufactured windows with built-in grilles or renovations where a Carrier sleeve is used with an existing non-Carrier grille.

Use of a Carrier wall sleeve with a non-Carrier grille requires installation of an Accessory Baffle Kit (see Fig. 4), which ensures a good seal between the unit and exterior grille to prevent air recirculation. Air recirculation is a large contributor to performance loss and premature damage to major components.

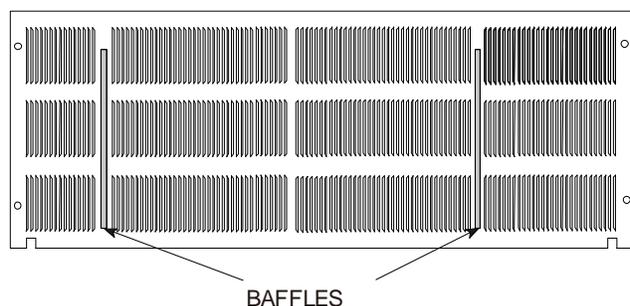


Fig. 1 - Remove Existing Outdoor Grille Baffles on Competitive Grille

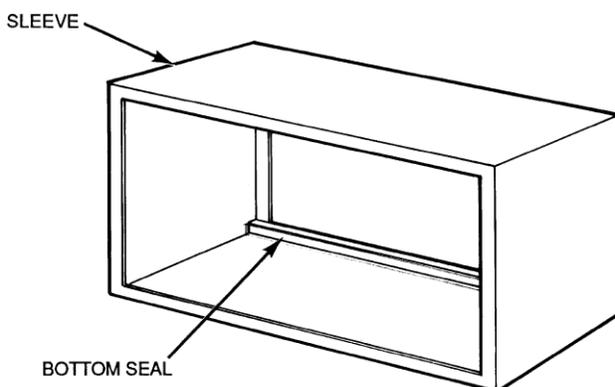
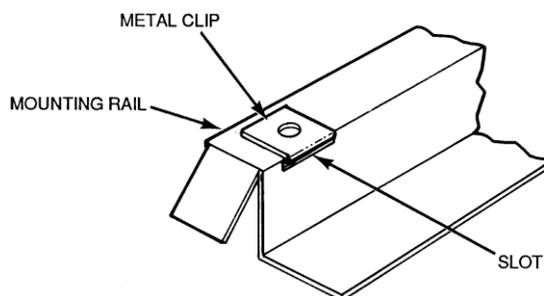


Fig. 3 - Remove Bottom Seal From GE Plastic Sleeve

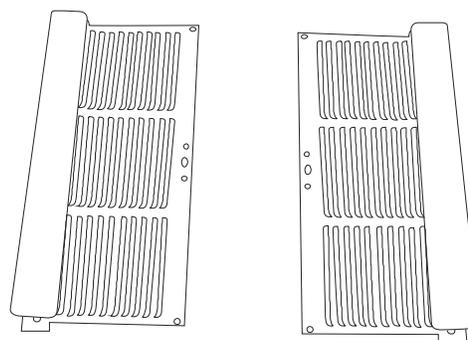


Fig. 4 - Accessory Baffle Kit

Note: Contact with your unit supplier to get the kit and it may be different from the shape shown above.

INSTALL UNIT INTO WALL SLEEVE

1. Carefully remove shipping tape from the front panel and vent door. See Fig.5.
2. Remove shipping screw from the vent door, if present. See Fig.6.
3. Remove front panel. See Fig.7.
4. Lift unit level and slide unit into wall sleeve until foam seal rests firmly against front of wall sleeve.
5. Secure with four screws (supplied) through the unit flange holes. See Fig.8.
6. Reinstall front panel. See Fig.9.

	<h1>CAUTION</h1>
UNIT DAMAGE HAZARD	
Failure to follow this caution may result in equipment damage or improper operation.	
Failure to remove shipping tape and screw will prevent fresh air vent door from opening and may result in damage to vent door cable.	

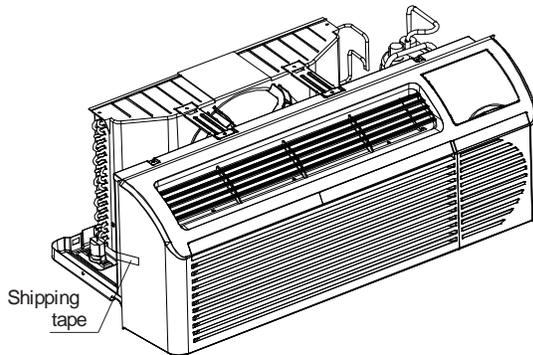


Fig.5. – Shipping Tape Location

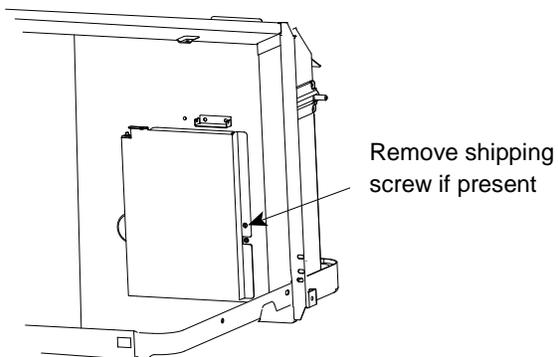
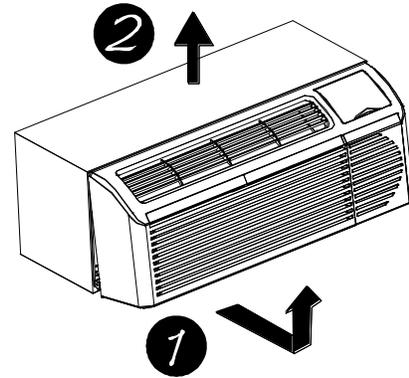


Fig.6. – Shipping Screw Location



Pull out at the bottom to release it from the tabs (1). Then lift up (2).

Fig.7. – Removing Front Panel

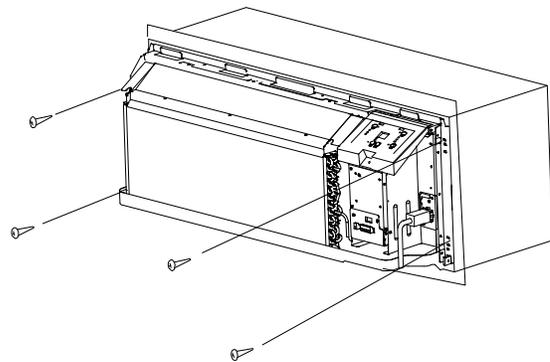
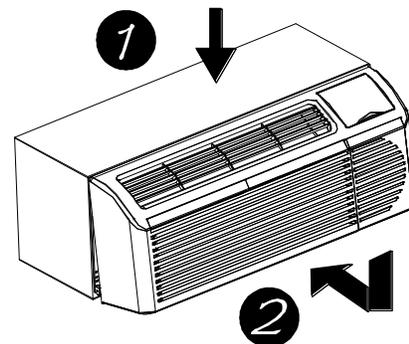


Fig.8. – Securing Unit



Place tabs over top rail (1). Push inward at bottom until panel snaps into place (2).

Fig.9. – Replacing Front Panel

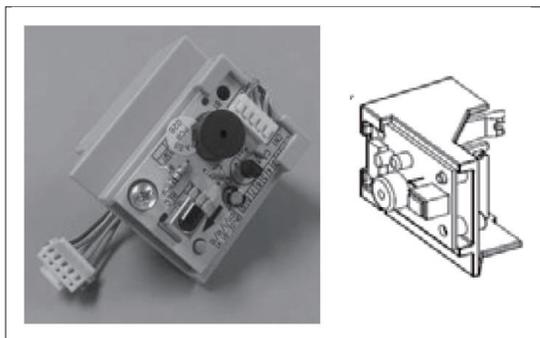
OPTIONAL REMOTE CONTROL AND RECEIVER MODULE

This PTAC unit can be operated with a remote control. The item number is 425-0057. It includes a remote control and receiver.

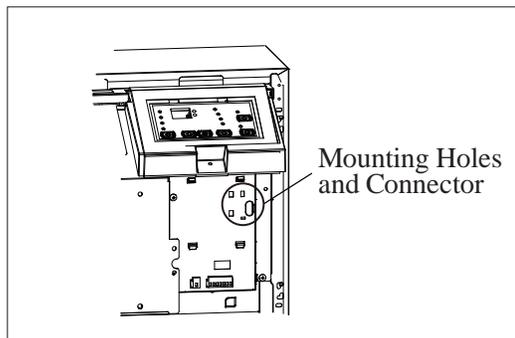
NOTE: Be sure there is no obstruction between receiver and remote control. Do not drop or throw the remote control. Do not let any liquid in the remote control and put the remote control directly under the sunlight or any place where is very hot.

Receiver Module

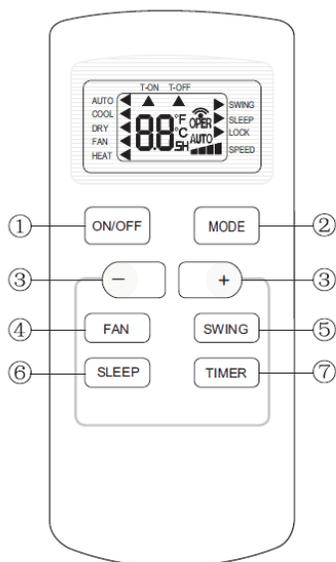
Receiver



Mounting Position



Remote Control



①: ON/OFF button

②: MODE button

③: +/- button

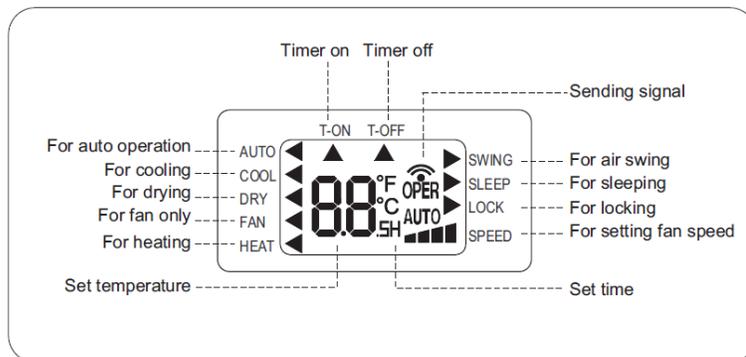
④: FAN button

⑤: SWING button

⑥: SLEEP button

⑦: TIMER button

Icon Display on Remote Control

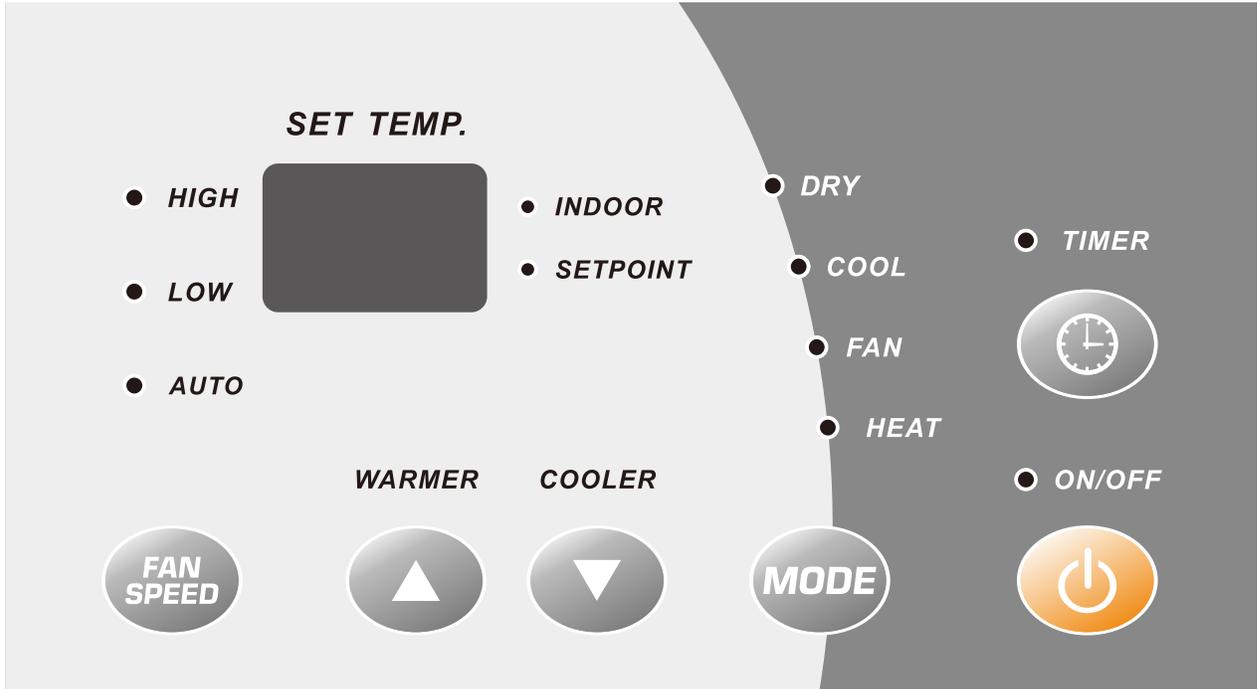


FUNCTION AND CONTROL

IMPORTANT: When unit is first started, high humidity conditions can cause condensation to form on discharge grille. Keep doors and windows closed. Room humidity will decrease and moisture will evaporate.

Panel Operation

It displays the function immediately while press the button, and the corresponding function will be started up in 2 seconds.



ABOUT THE CONTROLS ON THE UNIT

There are ON/OFF, WARMER, COOLER, MODE, FAN SPEED and TIMER six buttons in all.

1. Press ON/OFF button under OFF mode to turn on the unit. If press WARMER or COOLER button under OFF mode, the SET TEMP. display will show indoor temperature for 15 seconds and then turn off. If press MODE button under OFF mode, the controller will resume to the previous operation before power-off. The relevant LED will illuminate in green.
2. When unit is turned on, all buttons are available.
 - (1) ON/OFF: It is used for turning OFF the unit.
 - (2) MODE: It is used for selecting the operation mode between COOL, FAN, HEAT AND DRY.
 - (3) WARMER or COOLER: They are used for increasing / decreasing temperature and timer setting.
 - (4) FAN: It is used for setting HIGH, LOW and AUTO fan speed. The corresponding LED will illuminate.
 - (5) TIMER: It is used for setting timer function.
3. Timer function: It can be set either buttons on the control panel or by remote control.
 - (1) Timer ON: When the unit is off, press TIMER button to set the unit ON. Setting range is 0.5 ~24 hours. When the set time is reached, the unit will turn on and operate in the previous mode.
 - (2) Timer OFF: When the unit is on, press TIMER button to set the unit OFF Setting range is 0.5 ~24 hours. When the set time is reached, the unit will turn off.
 - (3) Timer setting: Press TIMER button to set timer function. The LED of TIMER will illuminate. The LCD displays selected time which can be adjusted by pressing "WARMER" or "COOLER" button. The timer function will be activated, and TIMER LED will be on after 5 seconds later of the setting. The range of timer setting is from "--" to 24 hours. If "--" is displayed, that means the timer setting is deactivated.
 - (4) Timer Preview: When timer function has been set, press TIMER button to preview the remaining time of timer.
 - (5) If Time function has been set, turning ON/OFF the unit or power failure will cancel timer setting.

4. Sleep function: This function can only be set by remote control. It will bring a more comfortable sleeping environment. This function is not available under FAN and AUTO modes.
5. DRY function: Set unit to dehumidifying.
6. Buzzer optional: When controller is energized, or valid remote control signal / button signal is received, the buzzer will beep each time.
7. Auto fan speed: Fan speed can be automatically changed according to different modes or indoor temperature to achieve higher comfort.
8. Emergency cooling operation: Emergency cooling, subject to your choice - allowed or rejected. When the room temperature $\geq 86^{\circ}\text{F}/30^{\circ}\text{C}$, the unit will start cooling automatically. When the room temperature reaches $81^{\circ}\text{F}/27^{\circ}\text{C}$, the unit will stop operating.
9. Remote control: optional.

Description of Each Operation

1. Temperature Parameter

- Indoor setting temperature (T_{preset})
- Room temperature (T_{amb})

2. System Basic Function

In any circumstances, the compressor will delay 3 minutes for protection once it's started up. Once the compressor is started up, the compressor won't stop with the change of the indoor temperature. While once the compressor is stopped, it can be started up only after 3 minutes delayed. (The compressor can be stopped immediately at the time of mode switchover, turning off the unit, adjusting setting temperature and turning to protection functions.)

1) Cooling Mode

Working conditions and process for cooling:

When $T_{\text{amb}} \geq T_{\text{preset}} + 2^{\circ}\text{F}(1^{\circ}\text{C})$, the unit is running in cooling mode. Meanwhile, the compressor is running and the fan is running at the setting fan speed.

When $T_{\text{amb}} \leq T_{\text{preset}} - 2^{\circ}\text{F}(1^{\circ}\text{C})$, the unit turns off. Meanwhile, the compressor will stop, and the indoor fan will run at the setting fan speed. If fan cycle is selected, indoor fan will stop operation 60 seconds later.

When $T_{\text{preset}} - 2^{\circ}\text{F}(1^{\circ}\text{C}) < T_{\text{amb}} < T_{\text{preset}} + 2^{\circ}\text{F}(1^{\circ}\text{C})$, the unit keeps previous running status.

* In this mode, the unit displays the setting temperature and the cooling LED and fan speed LED are illuminated. The setting temperature range is $61 \sim 86^{\circ}\text{F}(16 \sim 30^{\circ}\text{C})$. The actual operation temperature range depends on the dip switches selected, and the range is $61 \sim 86^{\circ}\text{F}(16 \sim 30^{\circ}\text{C})$; $63 \sim 80^{\circ}\text{F}(18 \sim 28^{\circ}\text{C})$; $65 \sim 78^{\circ}\text{F}(19 \sim 26^{\circ}\text{C})$; $68 \sim 75^{\circ}\text{F}(20 \sim 24^{\circ}\text{C})$.

2) Dry Mode

Without reducing the room temperature, the unit can dehumidify and make the room comfortable.

3) Fan Mode

In this mode, the compressor won't run and the temperature can't be adjusted (WARMER and COOLER buttons are invalid). The fan can operate at high, low or auto fan speed. The unit displays ambient temperature $32 \sim 122^{\circ}\text{F}(0 \sim 50^{\circ}\text{C})$, if the temperature exceeds the range, minimum value or maximum. Value displays. Fan speed and fan LED illuminate.

4) Heating Mode

- For cooling only with electric heater units, working conditions and process for heating:

When $T_{\text{amb}} - T_{\text{amb. compensation}} \leq T_{\text{preset}} - 2^{\circ}\text{F}(1^{\circ}\text{C})$, the unit is running in heating mode. Meanwhile, the electric heater will be started up 3 seconds later than the fan.

When $T_{\text{amb}} - T_{\text{amb. Compensation}} \geq T_{\text{preset}} + 2^{\circ}\text{F}(1^{\circ}\text{C})$, the electric heating will be turned off. Under fan cycle mode, indoor fan operates at the condition of blowing residual heat; if fan cycle mode is not selected, indoor fan will continue to run in set fan speed.

When $T_{\text{preset}} - 2^{\circ}\text{F}(1^{\circ}\text{C}) < T_{\text{amb}} - T_{\text{amb. compensation}} < T_{\text{preset}} + 2^{\circ}\text{F}(1^{\circ}\text{C})$, the unit keeps previous running status.

* In this mode, the unit displays the setting temperature and heating LED is illuminated. The setting temperature range is $61 \sim 86^{\circ}\text{F}(16 \sim 30^{\circ}\text{C})$.

- For heat pump with electric heater units, working conditions and process for heating:

If the room temperature (T_{amb}) is less than 5°F from set point the compressor will be turned on in the

heating function 10 seconds later and run until the room temperature is satisfied.

When $T_{amb} - T_{amb. compensation} \leq T_{preset} - 2 \text{ } \ddagger(1 \text{ } ^\circ\text{C})$, the unit is running in heating mode. Meanwhile, the compressor will be started up.

When $T_{amb} - T_{amb. compensation} \geq T_{preset} + 2 \text{ } \ddagger(1 \text{ } ^\circ\text{C})$, the compressor and the fan will be turned off.

When $T_{preset} - 2 \text{ } \ddagger(1 \text{ } ^\circ\text{C}) < T_{amb} - T_{amb. compensation} < T_{preset} + 2 \text{ } \ddagger(1 \text{ } ^\circ\text{C})$, the unit keeps previous running status.

If the room temperature (T_{amb}) falls to 5 °F below the set point temperature (T_{preset}) the reverse cycle heat will be shut off and the electric strip heat is turned on for one cycle 15 seconds later; and stop the operation when heating set point is satisfied.

* In this mode, the electric strip heaters and the compressor will not operate simultaneously.

The unit displays the setting temperature and heating LED is illuminated. The setting temperature range is 55 ~ 80 \ddagger (13 ~ 27 °C).

5) OFF Mode

If the OFF mode is selected, all the display will be closed except the power indicator and all the output are invalid. (Except the low temperature resistant protection)

If the WARMER or COOLER button is pressed, the unit display will extinguish after it displays the ambient temperature for 15 seconds and the indoor indicator will also go out after illuminated 15 seconds. By repressing the WARMER and COOLER button in the process of displaying the ambient temperature, 15 second will be calculated again.

6) Low Temperature Resistant Protection

This is valid in OFF, cooling, dry or fan mode.

Entry condition: if the dip switch 1 is on "UP" position, and the room temperature is lower than 40 \ddagger for 5 seconds continuously, the low temperature resistant protection will be activated.

Quit condition: When the room temperature raises more than 50 \ddagger , the low temperature resistant protection will be deactivated.

During the low temperature resistant protection, the unit displays "FP" and the running LED is in green color (including the OFF status). During this period, the unit won't be controlled by the wall thermostat and it will ignore the signal from the wall thermostat.

7) Open circuit and short circuit of temperature sensor

If the temperature sensor is open circuit or short circuit, the error code displays when the unit is turning on.

If the failure of the temperature sensor is detected, only the indoor fan will keep running in Cooling and Fan mode.

If the failure of the temperature sensor is detected in Heating mode, the indoor fan will blow the residual heat for 6 seconds and then turns off. Once the fan is stopped, it cannot be started up again. If the failure of the temperature sensor is detected during the residual heat blowing, the fan will be stopped after blowing 1 minute later.

3. Buttons and Display

1) Buttons

There are ON/OFF, WARMER, COOLER, MODE, FAN SPEED and TIMER six buttons in all.

a) In the OFF status, press the ON/OFF button to turn on the unit. In OFF mode, if press the WARMER or COOLER button, the display will be extinguished after the room temperature shows 15 seconds.

Pressing the MODE button in the OFF status, the previous mode will be activated and the running LED will be illuminated in green.

b) In the ON status, all buttons are in valid.

i) ON/OFF: Pressing this button, the unit can be switched between ON and OFF mode.

ii) MODE: Pressing this button, the unit can be switched among cooling, fan dry and heating made circularly.

iii) FAN SPEED: In the ON status, the fan speed can be selected to high, low and auto by pressing this button.

- iv) WARMER and COOLER: To adjust the setting temperature by pressing these two buttons; or set timer within 0 - 24 hours while in TIMER setting status. In 10 hour timer, the time is adjusted every 0.5 hour for each pressing. Above 10 hour timer, the time is adjusted every 1 hour for each pressing.

2) Digital display and LED display

There are 13 LEDs which are HIGH, LOW, AUTO, COOL, DRY, FAN, HEAT, ON/OFF, SETPOINT (setting temperature), INDOOR (room temperature), ON/OFF and STATUS (This LED is on the PC board), TIMER.

- a) Mode LED: when the unit is running in a certain kind of mode, the corresponding LED is illuminated.
- b) ON/OFF LED: The LED is green when the unit is running. The LED is red when the unit is turning off.
- c) Fan speed LED: When the unit is running at high, low or auto fan speed, the corresponding LED is illuminated.
- d) The digital display
 - i) In cooling and heating mode, it displays the setting temperature. In fan mode, it displays the room temperature.
 - ii) Error Codes: When the unit is energized, the STATUS LED illuminates. If there is any malfunction or protection, the STATUS LED will blink with the Error code.
When the unit is in the OFF status, there is not an error code showing (except the low temperature resistant protection), and the protections - 6, 7, 8 in the following table will be illuminated. If there are multiple protections or failure, it activates with the priority which is decreasing from 1 to 8.

1	Room temp. sensor open/short	Digital display 'F1', with STATUS light flash
2	Indoor coil sensor open or short	Digital display 'F2', with STATUS light flash
3	Outdoor coil sensor open/short	Digital display 'F4', with STATUS light flash
4	Air outlet temperature sensor open/short	Digital display 'FJ', with STATUS light flash
5	Low temperature protection	Digital display 'FP', with STATUS light flash
6	Thermostat wiring error	STATU LED flash 9 times and off 3 sec circularly
7	High temp. protection for evaporator	STATU LED flash 8 times and off 3 sec circularly
8	High temp. protection for condenser	STATU LED flash 6 times and off 3 sec circularly
9	Freeze protection for evaporator	STATU LED flash 5 times and off 3 sec circularly
10	Defrost (heat pump type)	STATU LED flash 7 times and off 3 sec circularly
11	Refrigerant lacking protection	Digital display 'F0'
12	Compressor over-current protection	Digital display 'E5'
13	Protection for electric heater error	Digital display 'A2'

In OFF mode, digital display will not show the error code (except the low temperature protection), and number 6, 7, 8 protection marks will be eliminated. When multiple protections are overlapped, it activates only the protection with the highest priority.

4. Especial Functions

1) Energy Management Input (Front Desk Control)

“EM”: It is used for energy management input. When the terminal 24 VAC is connected, the unit will be turned off and the unit is in OFF mode.

The control panel or thermostat is invalid at this time. If there is no signal (0 VAC), the unit can be operated by the control panel or thermostat. The wall thermostat is ignored when the unit is turned off by EM, and it

needs 3 seconds to detect the signal from the wall thermostat after the unit is turned on by EM. (24 VAC signal range is 18~28 VAC, 0 VAC signal range is 0~5 VAC).

2) Configuration – Easy for hotel personnel to repair (7 dip switches, the configuration is valid only after the unit is power off).

a) EL- HEAT ONLY (only electric heating; valid in wall thermostat mode)

ON – only electric heating. OFF – normal heating mode. The default setting is OFF.

This function is only applicable to HEAT PUMP.

b) REMOTE (wall thermostat)

ON – wall thermostat is valid. OFF – control panel is valid. The default setting is OFF.

c) FAN CYCLE FOR HEAT (invalid in remote control mode)

ON – fan runs continuously. OFF – fan will be stopped when room temperature is satisfied. The default setting is OFF.

(It follows the operation on the wall thermostat when the wall thermostat is connected).

d) FAN CYCLE FOR COOL (invalid in remote control mode)

ON – fan will be stopped when room temperature is satisfied. OFF – fan runs continuously. The default setting is OFF.

(It follows the operation on the wall thermostat when the wall thermostat is connected).

e) SETPOINT (SETPOINT1, SETPOINT 2) (invalid in wall thermostat mode)

OFF OFF – (61~86 ℉); ON OFF - (63~80 ℉); OFF ON - (65~78 ℉); ON ON - (68~75 ℉); The default setting is OFF OFF (61~86 ℉).

If the setting temperature exceeds the setpoint range, the unit always displays 61~86 ℉. The actual working temperature range follows the configuration above.

f) LOW TEMPERATURE RESISTANT PROTECTION (valid in wall thermostat mode)

ON – invalid. OFF – valid. The default setting is OFF.

3) Configuration – Do not need hotel maintenance personnel to control (configuration is valid after B dial-up is energized, and the configuration is invalid after A dial-up is energized).

a) Heat pump and Heat Cool units for selection. (Heat Pump is electric heating + heat pump; Heat Cool is electric heating + cooling only) Heat pump - ON; Heat cool – OFF.

Heat pump units should be equipped with Heat pump type wall thermostat. Heat Cool units should be equipped with Heat Cool type wall thermostat.

b) Neglect for time delay (TIMER RESET)

When the dial-up is activated for once (from OFF to ON, or from ON to OFF), it will cancel all the current delay timer (once) (for example, the compressors minimum stop time, compressors minimum running time, electric heating minimum stop time). After validation, if the dial-up has no action, all the delay will resume normal. The exact delay time is as below:

Electric heating minimum OFF time-----1s

Compressor minimum stop time-----9s

Compressor minimum running time-----9s

Four-way valve delays for 2 minutes-----6s (available when the compressor is required)

4) Configuration mode

After the unit is turned on for 30 seconds, press the fan speed button and the COOLER button for 5 seconds, the configuration mode will be started up. After turning to the configuration mode, if adjusting the temperature offset by buttons to turn to switching condition, the load will be activated 3 seconds later. If turning to switching condition due to the change of the ambient temperature, it can be activated only after quitting the configuration mode.

In the configuration mode, the five configuration modes as below can be selected by FAN SPEED

button.

Mode one: Fahrenheit /Centigrade display mode

Fahrenheit and Centigrade display mode can be switched by pressing WARMER or COOLER button.

F indicates Fahrenheit display mode; C indicates Centigrade display mode

Mode two: Temperature compensation value adjustment mode for dry.

Press WARMER/COOLER button can increase or decrease temperature compensation value for 1 ℉ (or °C). The range for indoor ambient temperature compensation value is -6 to +6℉ (-3 to +3 °C) (Dry mode LED is illuminated).

Mode three: Adjusting mode for cooling temperature offset.

WARMER button can increase offset temperature 1 ℉(or °C). COOLER button can decrease offset temperature 1 ℉(or °C).

The room temperature offset adjusting range is -6 to +6℉ (-3 to +3 °C) (cooling LED is illuminated).

Mode four: Adjusting mode for heating temperature offset

WARMER button can increase offset temperature 1℉(or °C). COOLER button can decrease offset temperature 1℉(or °C).

The room temperature offset adjusting range is -6 to +6℉ (-3 to +3 °C) (heating LED is illuminated).

The temperature offset is default 0 in dry, cooling and heating mode. They can allocate different offset in cooling and heating mode respectively. The offset cannot be adjusted in fan mode.

Mode five: Display switchover between setting temperature and ambient temperature in heating and cooling mode;

Press the WARMER button or COOLER button to switch the setting temperature and room temperature displaying;

Setting temperature displaying: the digital indicator displays SP. After quitting configuration mode, the heating mode and the cooling mode display the set temperature constantly;

Room temperature displaying: the digital indicator displays AA. After quitting the configuration mode, the heating mode and the cooling mode display the ambient room temperature. For below circumstances, it displays set temperature for 10 seconds and then turns to display room temperature. (Note: if room temperature displaying is set, the unit is in cooling mode or heating mode, timer will be displayed for 5 seconds, then turn to display set temperature for 5s and then turn to display ambient temperature.)

- a) Press mode button
- b) Re-energized after power failure
- c) Restart the unit
- d) Turn on the unit after EM turn off unite.
- e) Adjust the set temperature by WARMER or COOLER button

Mode six: switchover between allowing emergent cooling auto start-up and not allowing emergent cooling auto start-up.

Press WARMER or COOLER button to switchover between allowing emergent cooling auto start-up and not allowing emergent cooling auto start-up.

Allowing emergent cooling auto start-up, digital displays CA;

Not allowing emergent cooling auto start-up, digital displays Cd;

Method for quitting configuration mode: Pressing the mode button or wait for 30 seconds without any operation.

5) Timer (same as "Neglect for time delay" on page 18)

Hold the WARMER and COOLER buttons for 3 seconds simultaneously, it will weaken all recent running delay timer (once). (It's valid only during the compressor delay or electric heating mini stop time or compressor minimum running time)

6) Memory Function

The unit will restart in previous mode and setting when the unit re-energized from a power failure.

7) Restore factory settings

In standby and OFF status, after pressing "fan speed" + "WARMER" for 3s and the digital indicator displays "00" for 3 seconds, it shows that the factory settings has been restored. Meanwhile, the configuration information is default to display Fahrenheit. Heating offset and cooling offset is 0 and the

setting temperature is displayed. T value is 0, the fan speed is medium and the setting temperature is 71 ℉.

5. Protection Functions

- 1) Defrost (heat pump only).
- 2) Entry condition: When the compressor is controlled by wall thermostat in heating mode, and the outdoor tube temperature $\leq 28 \text{ ℉} (-2 \text{ °C})$ is over 1 minute continuously, the compressor and outdoor fan will stop running. Then indoor fan is running normally according to the wall thermostat signal. If the heating is required at the moment, then the compressor operation will be replaced by the electric heating.
- 3) Quit condition: In the frost protection mode, when the outdoor tube temperature $\geq T 40 \text{ ℉} (5 \text{ °C})$ is over 10 minutes, it will quit the frost protection mode.
- 4) High temperature protection for evaporator.
- 5) Entry condition: When the compressor is controlled by wall thermostat in heating mode, and the indoor tube temperature $\leq 136 \text{ ℉} (58 \text{ °C})$ is over 1 minute continuously, the compressor and outdoor fan will stop running and the indoor fan is running normally according to the wall thermostat signal. If the heating is required at the moment, then the compressor operation will be replaced by the electric heating after 15 seconds.
- 6) Anti-freezing protection for the evaporator.
- 7) Entry condition: When the compressor is controlled by wall thermostat in heating mode, and the indoor tube temperature $\leq 28 \text{ ℉} (-2 \text{ °C})$ is over 1 minute continuously, the compressor and outdoor fan will stop running and the indoor fan is running normally according to the wall thermostat signal. (If the indoor fan stops before the protection, it will be activated and run at medium fan speed.)
- 8) Quit condition: In the anti-freezing protection, when the indoor tube temperature $\leq 40 \text{ ℉} (5 \text{ °C})$ is over 2 minutes, the system will quit anti-freezing protection.
- 9) High temperature protection for the outdoor condenser.
- 10) Entry condition: When the compressor is controlled by wall thermostat, and the outdoor tube temperature $\leq 149 \text{ ℉} (65 \text{ °C})$ is over 1 minute continuously, then the high temperature protection will be activated. The compressor will stop running, outdoor fan will keep running continuously, and the indoor fan is running normally according to the wall thermostat signal.
- 11) Quit condition: If the outdoor tube temperature $\leq 131 \text{ ℉} (55 \text{ °C})$ is over 2 minutes, this protection will be ended.

Remote Control Operation

Note:

- When power is connected (stand by condition), operate the air conditioner with the remote control.
- Indoor controller will beep each time it receives a command from the remote control, and the sending signal icon  displayed on the remote control.
- It shows the set temperature on the remote control.

ON/OFF -Turns the unit on or off. There is a 3 minute compressor delay when the unit is turned on.

MODE – Pressing the MODE button will select between AUTO, COOL, DRY, FAN, or HEAT.

- **AUTO** mode - Unit will operate automatically according to ex-factory setting; the set temperature cannot be changed. The fan speed can be changed by pressing the **FAN** button in this mode.
- **COOL** mode - Unit cools room to set point temperature.
- **DRY** mode - FAN runs in LOW speed only. (FAN speed cannot be changed).
- **FAN** mode - Selects fan only operation. Set point temperature can be changed. Fan speed can be set to HIGH, LOW or AUTO.
- **HEAT** mode - Unit heats room to set point temperature.

+ / - Raises or Lowers the set point temperature – The set temperature will increase or decrease 1°F by each pressing. Holding the button down for more than 2 seconds will cause the set point to auto increment or decrement. This does not function in the AUTO mode since the temperature set point cannot be changed.

FAN – Press this button to change fan speeds, HIGH, LOW or AUTO, while in the HEAT, COOL, FAN modes. When in the AUTO setting, the fan will run faster the further away from the set point it gets. On the other hand, the closer it gets to the set point the slower it will run. FAN speed cannot be changed in Dry mode.

SWING – Pressing the SWING button will start and stop the louver moving up and down.

SLEEP – In the COOL, Heat and Dry mode press the SLEEP button to active the function. Press the SLEEP mode button to toggle SLEEP mode off and return to normal operation.

The SLEEP mode does not work in the FAN or AUTO modes and is deactivated when the unit is turned off or power is lost. On power up, the SLEEP mode must be turned on again if needed.

TIMER – Press this button when the unit is ON, the autostop function will stop the unit in the current mode. The unit will turn off when the selected time is reached. T-OFF and H icons will be blinking after the TIMER button pressed. Press “+” or “-” button to adjust the time value in five seconds. Each press will increase or decrease 0.5 hour. Holding the button down for more than 2 seconds will cause the set point to auto increment or decrement. Release this button after your required set time is reached. Press this button again for confirming. T-OFF and H icons will then stop blinking.

- Press this button when the unit is OFF, the autostart function will turn the unit on in the previous mode. The unit will turn on when the selected time is reached. T-ON and H icons will be blinking after the TIMER button pressed. Press “+” or “-” button to adjust the time value in five seconds. Each press will increase or decrease 0.5 hour. Holding the button down for more than 2 seconds will cause the set point to auto increment or decrement. Release this button after your required set time is reached. Press this button again for confirming. T-ON and H icons will then stop blinking.
- Review and Cancel Timer function: If TIMER function is activated, press TIMER button once to review the remaining time, and cancel this function by pressing the button again in 5 minutes.

Note:

- The range of time setting is 0.5 ~ 24 hours.
- The interval between two motions cannot exceed 5 seconds, otherwise the remote control will exit setting status.

REPLACING BATTERIES

Slightly press down on the top center of the battery cover and slide in the direction of the arrowhead.

Remove old batteries. Insert two new AAA 1.5V batteries, paying attention to the polarity. Re-install the back cover of the remote control.

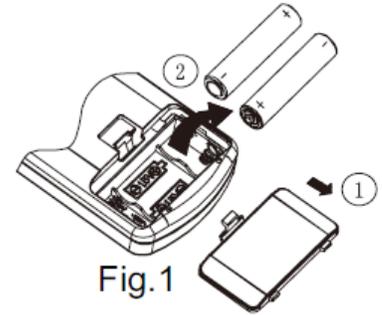


Fig.1

NOTE:

Do not use the old, different, or rechargeable batteries.

If the remote control will not be used for a long period of time, remove the batteries.

If the remote control does not operate properly, remove the batteries for 30 seconds and re-install (resets the remote).

The distance between the remote control and unit should be within 26 feet (8 meters). And there with no obstacle.

Keep the remote control away from the TV set or stereo sound sets at least 3 feet to avoid signal interfered.

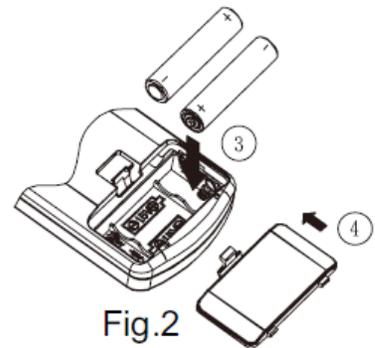
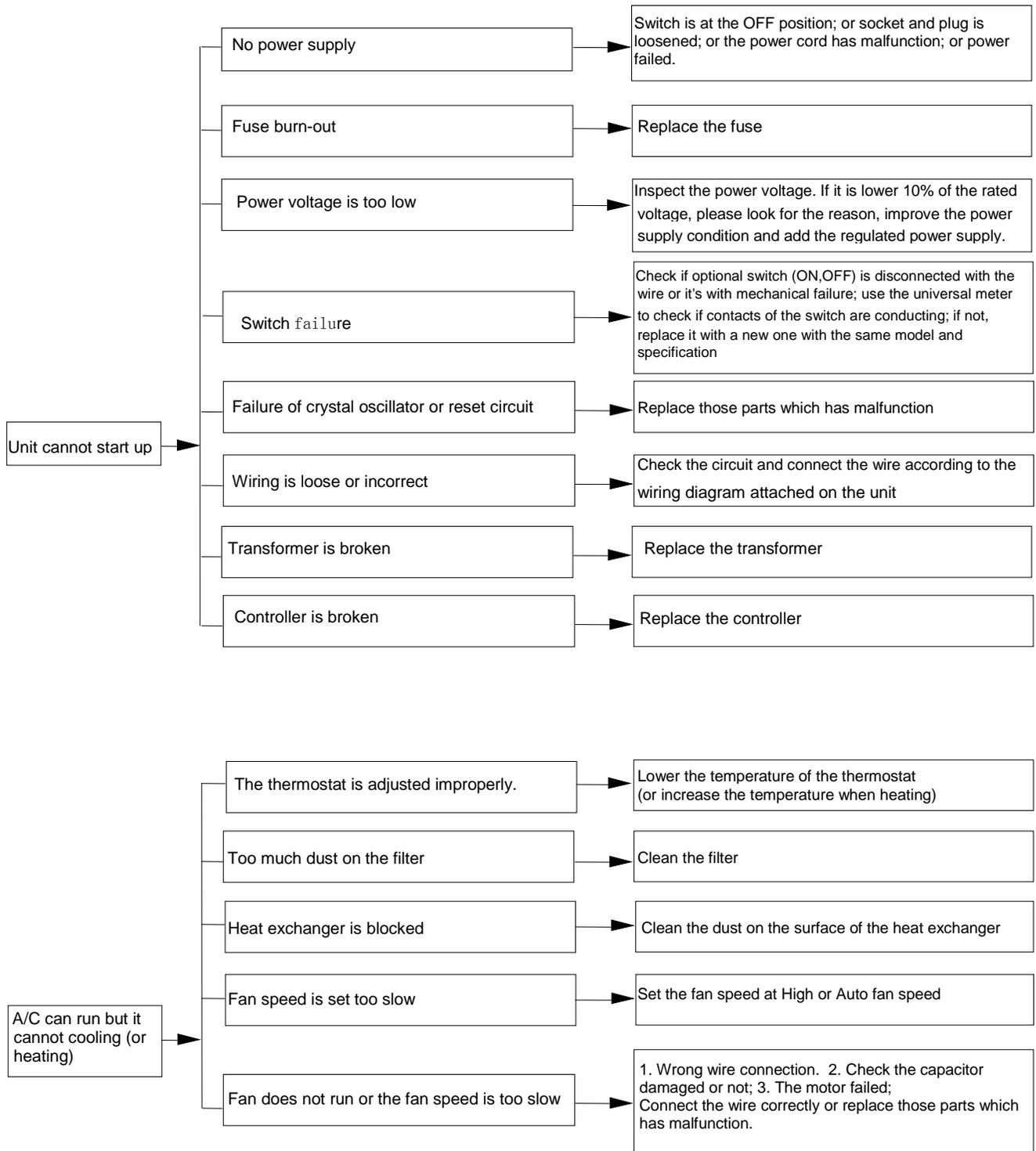
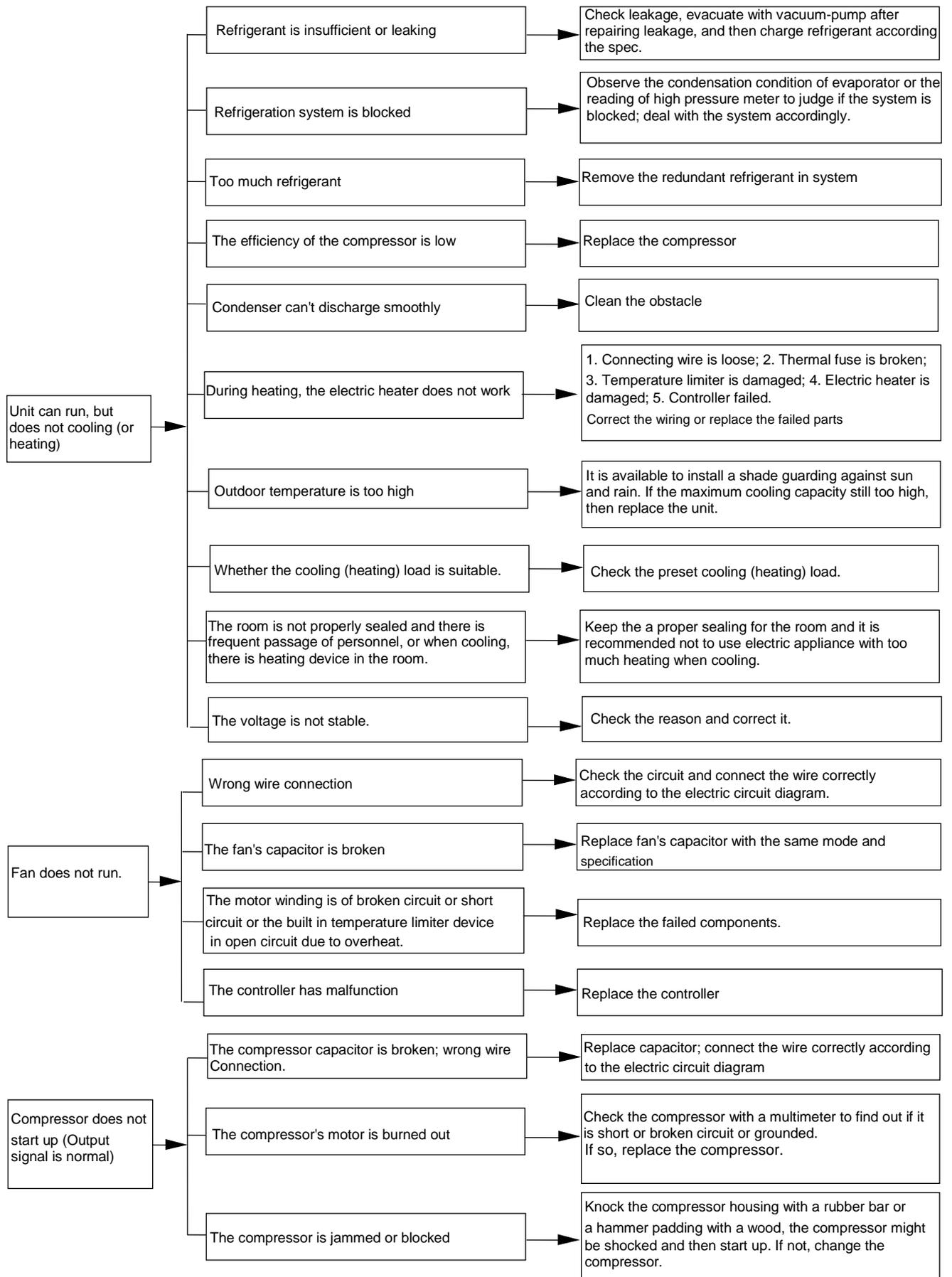
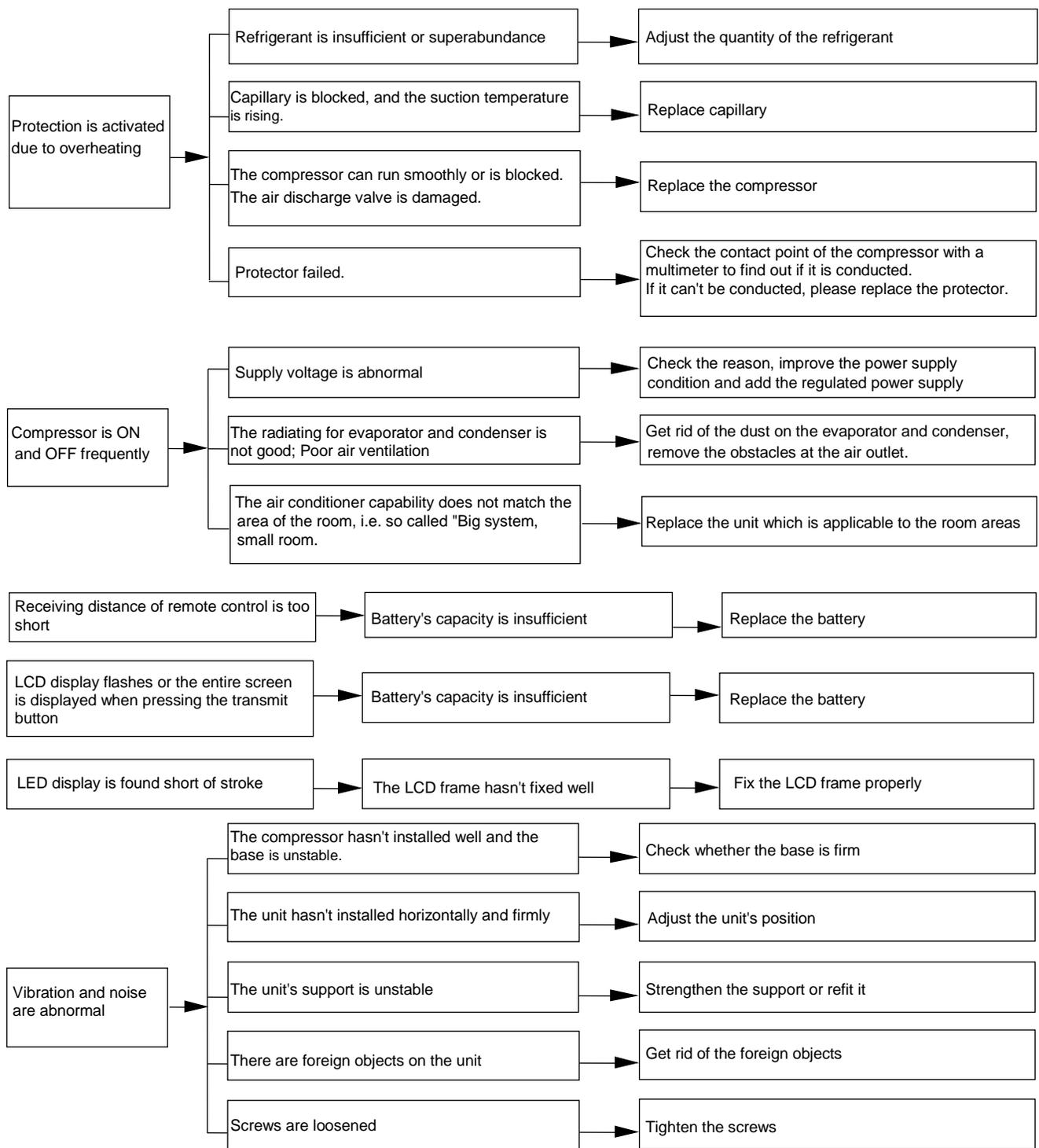


Fig.2

TROUBLESHOOTING







Error Code

No.	Malfunction Name	Error Code	A/C Status	Possible Causes
1	Indoor ambient temperature sensor is open/short-circuited	F1	The unit will stop operation as it reaches the temperature point.	1.The wiring terminal between indoor ambient temperature sensor and controller is loosened or poorly contacted; 2.There's short circuit due to trip-over of the parts on controller; 3.Indoor ambient temperature sensor is damaged (Please check it by referring to the resistance table for temperature sensor) 4.Main board is broken.
2	Indoor evaporator temperature sensor is open/short-circuited	F2	The unit will stop operation as it reaches the temperature point.	1.The wiring terminal between indoor evaporator temperature sensor and controller is loosened or poorly contacted; 2.There's short circuit due to the trip-over of the parts on controller; 3.Indoor evaporator temperature sensor is damaged (Please check it by referring to the resistance table for temperature sensor) 4.Main board is broken.
3	Outdoor ambient temperature sensor is open/short-circuited	F4	The unit will stop operation as it reaches the temperature point.	1.The wiring terminal between outdoor ambient temperature sensor and controller is loosened or poorly contacted; 2.There's short circuit due to the trip-over of the parts on controller; 3.Outdoor ambient temperature sensor is damaged (Please check it by referring to the resistance table for temperature sensor) 4.Main board is broken.
4	low temperature prevention protection	FP	A/C enters into pure electric heating mode, and low temperature protection is started up.	1.Indoor ambient temperature is lower than 40°F(5°C) continuously.; 2.Indoor ambient temperature sensor is damaged; 3.Main board is broken.

Maintenance Method for Normal Malfunction

1. Air Conditioner Cannot Start Up.

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
No power supply, or poor connection for power plug	After energization, operation indicator isn't bright and the buzzer can't give out sound	Confirm whether it's due to power failure. If yes, wait for power recovery. If not, check power supply circuit and make sure the power plug is connected well.
Poor connection for wiring terminals	Under normal power supply circumstances, operation indicator isn't bright after energization	Check the circuit according to circuit diagram and connect wires correctly. Make sure all wiring terminals are connected firmly.
Electric leakage for air conditioner	After energization, room circuit breaker trips off at once	1. Make sure the air conditioner is grounded reliably. 2. Make sure wires of air conditioner is connected correctly. 3. Check the wiring inside air conditioner. Check whether the insulation layer of power cord is damaged; if yes, place the power cord.
Model selection for air switch is improper	After energization, air switch trips off	Select proper air switch
Malfunction of remote controller	After energization, operation indicator is bright, while no display on remote controller or buttons have no action.	Replace batteries for remote controller

2. Poor Cooling

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Set temperature is improper	Observe the set temperature on remote controller or Membrane	Adjust the set temperature.
Rotation speed is set too low	Small wind blow	Set the fan speed at high or medium.
Filter is blocked	Check the filter to see it's blocked	Clean the filter.
Installation position for unit is improper	Check whether the installation position is proper according to installation requirement for air conditioner	Adjust the installation position.
Refrigerant is leaking	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range	Find out the leakage causes and deal with it. Add refrigerant.
Malfunction of capillary	Discharged air temperature during cooling is higher than normal discharged wind temperature; Discharged air temperature during heating is lower than normal discharged wind temperature; Unit's pressure is much lower than regulated range. If refrigerant isn't leaking, part of capillary is blocked	Replace the capillary.
Malfunction of fan motor	The fan motor can't operate	Refer to point 4 of maintenance method for details.
Malfunction of compressor	Compressor can't operate	Refer to point 5 of maintenance method for details.

3. Poor Heating for Electric Heater

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Electric heating relay on main board is damaged	Even heating condition is satisfied, electric heater can't be started up under heating mode	Replace the main board with the same model.
Connection needle stand between main board and display board is loose	Even heating condition is satisfied, electric heater can't be started up under heating mode	Insert the needle stand tightly.
Set temperature and ambient temperature are almost the same	Poor heating effect	Increase the set temperature.

Tube temperature protection	When ambient temperature is high, the detected temperature by indoor tube temperature sensor is high. The detected temperature by temperature sensor at air outlet is also high	Increase the set fan speed. When indoor tube temperature decreases to a certain value, it will resume automatically.
Protection of temperature limiter	Check whether the air inlet is blocked by curtains, clothes, etc.	Clean the filter. Move curtains, clothes and other obstacles.
Malfunction of temperature limiter	When turning on the unit, the heating effect is poor. Use universal meter to measure the two contact points of temperature limiter. If the resistance value is too big, the temperature limiter is damaged	Replace the temperature limiter.
Thermal fuse is burnt out	When turning on the unit, the heating effect is poor. Use universal meter to measure the two contact points of temperature limiter. If the resistance value is too big, the temperature limiter is damaged	Replace the thermal fuse.

4. Fan Motor Cannot Operate

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly.
Connection needle stand between main board and display board is loose	Check whether the needle stand is loose	Insert the needle stand tightly.
Fan capacitor is damaged	1. Discharge the capacitor at first, and then use universal meter to measure the resistance of fan capacitor. It displays 0 or very small 2. If the resistance is very big, measure the voltage at both ends of capacitor. If the voltage at both ends of capacitor is same with the power input voltage, the fan capacitor is damaged	Replace fan capacitor.
Power voltage is a little low or high	Use universal meter to measure the power supply voltage. The voltage is a little high or low	Suggest to equip with voltage regulator .
Motor of outdoor unit is damaged	When unit is on, cooling/heating performance is bad and ODU compressor generates a lot of noise and heat.	Change compressor oil and refrigerant. If no better, replace the compressor with a new one.

5. Compressor Cannot Operate

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Wrong wire connection, or poor connection	Check the wiring status according to circuit diagram	Connect wires according to wiring diagram to make sure all wiring terminals are connected firmly.
Compressor relay on main board is damaged or needle stand of compressor is loose	Check whether relay can operate normally under cooling status	Replace the main board with the same model.
Capacitor of compressor is damaged	1. Discharge the capacitor at first, and then use universal meter to measure the resistance of fan capacitor. It displays 0 or very small 2. If the resistance is very big, measure the voltage at both ends of capacitor. If the voltage at both ends of capacitor is same with the power input voltage, the fan capacitor is damaged	Replace the capacitor of compressor.
Power voltage is low or high	After turning on the unit, poor cooling effect or the compressor is turned on or turned off frequently. Use universal meter to measure the power voltage	The fluctuation of the rate voltage is 10%. If the voltage is low or high, please equip with voltage regulator.
Coil of compressor is burnt out	Use universal meter to measure the resistance between compressor terminals and it's 0	Repair or replace compressor.
Cylinder of compressor is blocked	Compressor can't operate	Repair or replace compressor.

6. Air Conditioner is Leaking

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
Drainage duct is blocked	There's water leakage at indoors	Eliminate the obstacles inside the drainage duct.
Air conditioner isn't inclined outwards	There's water leakage at indoors	The complete unit should incline outwards about 3°.

7. Abnormal Sound and Vibration

Possible Causes	Discriminating Method (Air conditioner Status)	Troubleshooting
When turn on or turn off the unit, the panel and other parts will expand and there's abnormal sound	There's the sound of "PAPA"	Normal phenomenon. Abnormal sound will disappear after a few minutes.
When turn on or turn off the unit, there's abnormal sound due to flow of refrigerant inside air conditioner	Water-running sound can be heard	Normal phenomenon. Abnormal sound will disappear after a few minutes.
Foreign objects inside the unit or there're parts touching together inside the unit	There's abnormal sound fro the unit	Remove foreign objects. Adjust all parts' position of unit, tighten screws and stick damping plaster between connected parts.
Abnormal shake of compressor	Outdoor unit gives out abnormal sound	Adjust the support foot mat of compressor, tighten the bolts.
Abnormal sound inside the compressor	Abnormal sound inside the compressor	If add too much refrigerant during maintenance, please reduce refrigerant properly. Replace compressor for other circumstances.

Appendix

Appendix 1: Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units (15K)							
Temp. (°F)	Resistance (kΩ)	Temp. (°F)	Resistance (kΩ)	Temp. (°F)	Resistance (kΩ)	Temp. (°F)	Resistance (kΩ)
-2.2	138.1	68	18.75	138.2	3.848	208.4	1.071
-0.4	128.6	69.8	17.93	140	3.711	210.2	1.039
1.4	121.6	71.6	17.14	141.8	3.579	212	1.009
3.2	115	73.4	16.39	143.6	3.454	213.8	0.98
5	108.7	75.2	15.68	145.4	3.333	215.6	0.952
6.8	102.9	77	15	147.2	3.217	217.4	0.925
8.6	97.4	78.8	14.36	149	3.105	219.2	0.898
10.4	92.22	80.6	13.74	150.8	2.998	221	0.873
12.2	87.35	82.4	13.16	152.6	2.896	222.8	0.848
14	82.75	84.2	12.6	154.4	2.797	224.6	0.825
15.8	78.43	86	12.07	156.2	2.702	226.4	0.802
17.6	74.35	87.8	11.57	158	2.611	228.2	0.779
19.4	70.5	89.6	11.09	159.8	2.523	230	0.758
21.2	66.88	91.4	10.63	161.6	2.439	231.8	0.737
23	63.46	93.2	10.2	163.4	2.358	233.6	0.717
24.8	60.23	95	9.779	165.2	2.28	235.4	0.697
26.6	57.18	96.8	9.382	167	2.206	237.2	0.678
28.4	54.31	98.6	9.003	168.8	2.133	239	0.66
30.2	51.59	100.4	8.642	170.6	2.064	240.8	0.642
32	49.02	102.2	8.297	172.4	1.997	242.6	0.625
33.8	46.6	104	7.967	174.2	1.933	244.4	0.608
35.6	44.31	105.8	7.653	176	1.871	246.2	0.592
37.4	42.14	107.6	7.352	177.8	1.811	248	0.577
39.2	40.09	109.4	7.065	179.6	1.754	249.8	0.561
41	38.15	111.2	6.791	181.4	1.699	251.6	0.547
42.8	36.32	113	6.529	183.2	1.645	253.4	0.532
44.6	34.58	114.8	6.278	185	1.594	255.2	0.519
46.4	32.94	116.6	6.038	186.8	1.544	257	0.505
48.2	31.38	118.4	5.809	188.6	1.497	258.8	0.492
50	29.9	120.2	5.589	190.4	1.451	260.6	0.48
51.8	28.51	122	5.379	192.2	1.408	262.4	0.467
53.6	27.18	123.8	5.197	194	1.363	264.2	0.456
55.4	25.92	125.6	4.986	195.8	1.322	266	0.444
57.2	24.73	127.4	4.802	197.6	1.282	267.8	0.433
59	23.6	129.2	4.625	199.4	1.244	269.6	0.422
60.8	22.53	131	4.456	201.2	1.207	271.4	0.412
62.6	21.51	132.8	4.294	203	1.171	273.2	0.401
64.4	20.54	134.6	4.139	204.8	1.136	275	0.391
66.2	19.63	136.4	3.99	206.6	1.103	276.8	0.382

Appendix 2: Resistance Table of Outdoor and Indoor Tube Temperature Sensors (20K)

Temp. (°F)	Resistance (kΩ)						
-2.2	181.4	68	25.01	138.2	5.13	208.4	1.427
-0.4	171.4	69.8	23.9	140	4.948	210.2	1.386
1.4	162.1	71.6	22.85	141.8	4.773	212	1.346
3.2	153.3	73.4	21.85	143.6	4.605	213.8	1.307
5	145	75.2	20.9	145.4	4.443	215.6	1.269
6.8	137.2	77	20	147.2	4.289	217.4	1.233
8.6	129.9	78.8	19.14	149	4.14	219.2	1.198
10.4	123	80.6	18.13	150.8	3.998	221	1.164
12.2	116.5	82.4	17.55	152.6	3.861	222.8	1.131
14	110.3	84.2	16.8	154.4	3.729	224.6	1.099
15.8	104.6	86	16.1	156.2	3.603	226.4	1.069
17.6	99.13	87.8	15.43	158	3.481	228.2	1.039
19.4	94	89.6	14.79	159.8	3.364	230	1.01
21.2	89.17	91.4	14.18	161.6	3.252	231.8	0.983
23	84.61	93.2	13.59	163.4	3.144	233.6	0.956
24.8	80.31	95	13.04	165.2	3.04	235.4	0.93
26.6	76.24	96.8	12.51	167	2.94	237.2	0.904
28.4	72.41	98.6	12	168.8	2.844	239	0.88
30.2	68.79	100.4	11.52	170.6	2.752	240.8	0.856
32	65.37	102.2	11.06	172.4	2.663	242.6	0.833
33.8	62.13	104	10.62	174.2	2.577	244.4	0.811
35.6	59.08	105.8	10.2	176	2.495	246.2	0.77
37.4	56.19	107.6	9.803	177.8	2.415	248	0.769
39.2	53.46	109.4	9.42	179.6	2.339	249.8	0.746
41	50.87	111.2	9.054	181.4	2.265	251.6	0.729
42.8	48.42	113	8.705	183.2	2.194	253.4	0.71
44.6	46.11	114.8	8.37	185	2.125	255.2	0.692
46.4	43.92	116.6	8.051	186.8	2.059	257	0.674
48.2	41.84	118.4	7.745	188.6	1.996	258.8	0.658
50	39.87	120.2	7.453	190.4	1.934	260.6	0.64
51.8	38.01	122	7.173	192.2	1.875	262.4	0.623
53.6	36.24	123.8	6.905	194	1.818	264.2	0.607
55.4	34.57	125.6	6.648	195.8	1.736	266	0.592
57.2	32.98	127.4	6.403	197.6	1.71	267.8	0.577
59	31.47	129.2	6.167	199.4	1.658	269.6	0.563
60.8	30.04	131	5.942	201.2	1.609	271.4	0.549
62.6	28.68	132.8	5.726	203	1.561	273.2	0.535
64.4	27.39	134.6	5.519	204.8	1.515	275	0.521
66.2	26.17	136.4	5.32	206.6	1.47	276.8	0.509

Note: The information above is for reference only.

Appendix 3: Resistance Table of Outdoor and Indoor Tube Temperature Sensors (50K)

Temp. (°F)	Resistance (kΩ)						
-20.2	853.5	50	98	120.2	18.34	190.4	4.754
-18.4	799.8	51.8	93.42	122	17.65	192.2	4.609
-16.6	750	53.6	89.07	123.8	16.99	194	4.469
-14.8	703.8	55.4	84.95	125.6	16.36	195.8	4.334
-13	660.8	57.2	81.05	127.4	15.75	197.6	4.204
-11.2	620.8	59	77.35	129.2	15.17	199.4	4.079
-9.4	580.6	60.8	73.83	131	14.62	201.2	3.958
-7.6	548.9	62.6	70.5	132.8	14.09	203	3.841
-5.8	516.6	64.4	67.34	134.6	13.58	204.8	3.728
-4	486.5	66.2	64.33	136.4	13.09	206.6	3.619
-2.2	458.3	68	61.48	138.2	12.62	208.4	3.514
-0.4	432	69.8	58.77	140	12.17	210.2	3.413
1.4	407.4	71.6	56.19	141.8	11.74	212	3.315
3.2	384.5	73.4	53.74	143.6	11.32	213.8	3.22
5	362.9	75.2	51.41	145.4	10.93	215.6	3.129
6.8	342.8	77	49.19	147.2	10.54	217.4	3.04
8.6	323.9	78.8	47.08	149	10.18	219.2	2.955
10.4	306.2	80.6	45.07	150.8	9.827	221	2.872
12.2	289.6	82.4	43.16	152.6	9.489	222.8	2.792
14	274	84.2	41.34	154.4	9.156	224.6	2.715
15.8	259.3	86	39.61	156.2	8.854	226.4	2.64
17.6	245.6	87.8	37.96	158	8.555	228.2	2.568
19.4	232.6	89.6	36.38	159.8	8.268	230	2.498
21.2	220.5	91.4	34.88	161.6	7.991	231.8	2.431
23	209	93.2	33.45	163.4	7.726	233.6	2.365
24.8	198.3	95	32.09	165.2	7.47	235.4	2.302
26.6	189.1	96.8	30.79	167	7.224	237.2	2.241
28.4	178.5	98.6	29.54	168.8	6.998	239	2.182
30.2	169.5	100.4	28.36	170.6	6.761	240.8	2.124
32	161	102.2	27.23	172.4	6.542	242.6	2.069
33.8	153	104	26.15	174.2	6.331	244.4	2.015
35.6	145.5	105.8	25.11	176	6.129	246.2	1.963
37.4	138.3	107.6	24.13	177.8	5.933	248	1.912
39.2	131.5	109.4	23.19	179.6	5.746	249.8	1.863
41	125.1	111.2	22.29	181.4	5.565	251.6	1.816
42.8	119.1	113	21.43	183.2	5.39	253.4	1.77
44.6	113.4	114.8	20.6	185	5.222	255.2	1.725
46.4	108	116.6	19.81	186.8	5.06	257	1.682
48.2	102.8	118.4	19.06	188.6	4.904	258.8	1.64

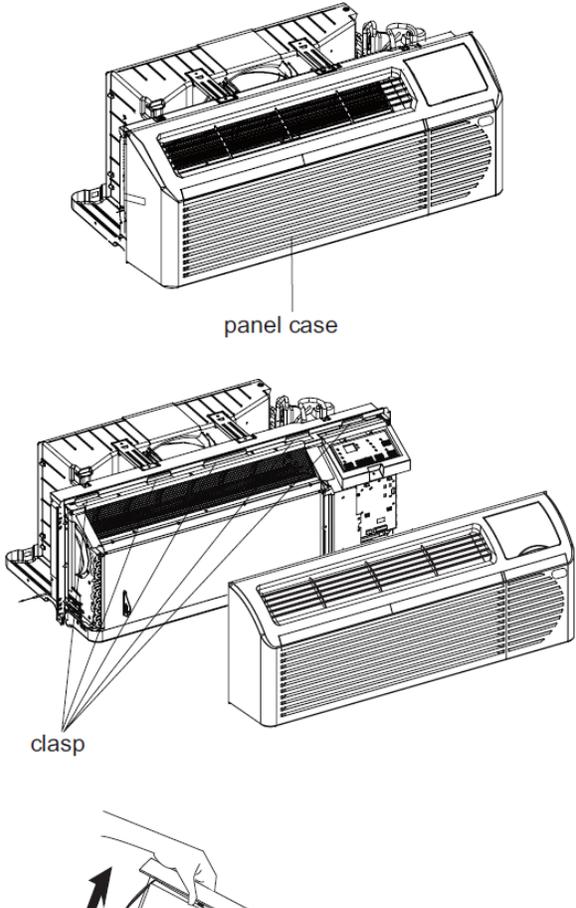
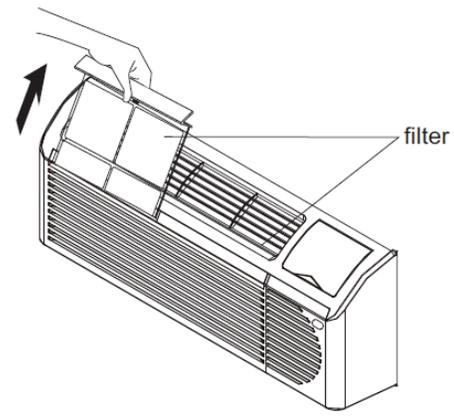
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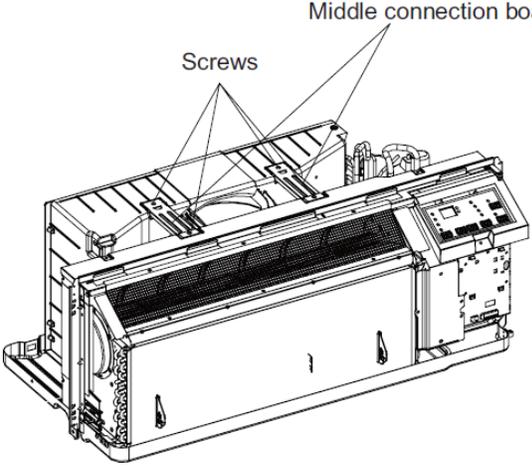
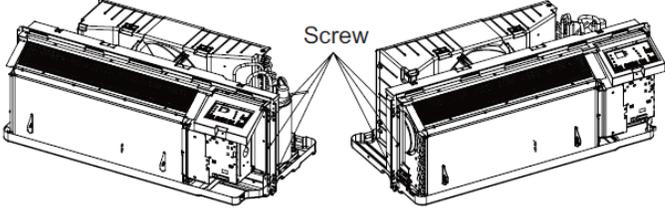
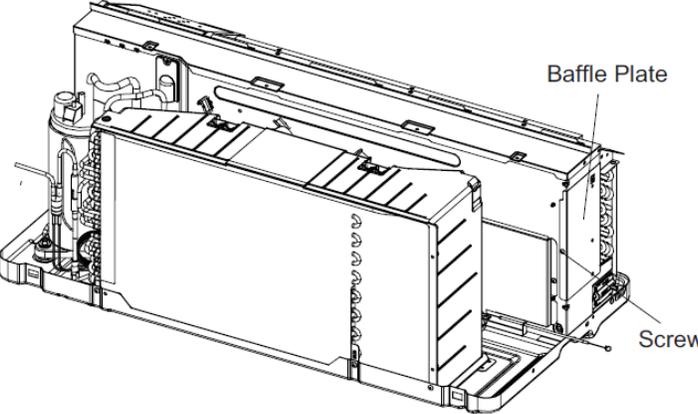
DISASSEMBLY PROCEDURE

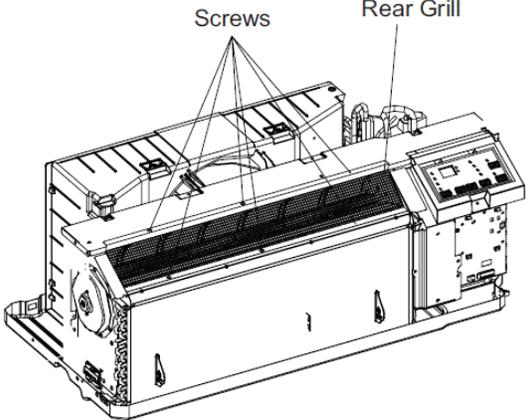
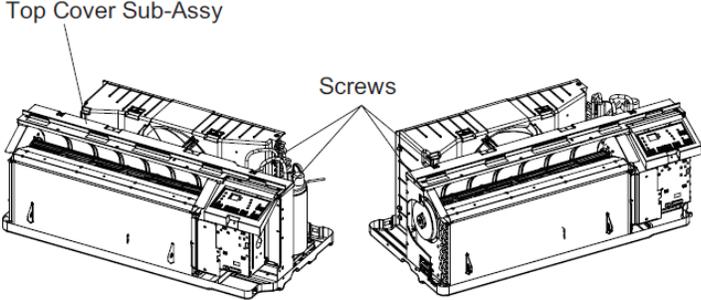
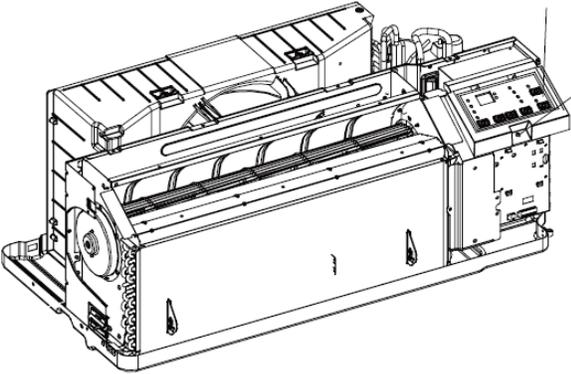
 **Warning**

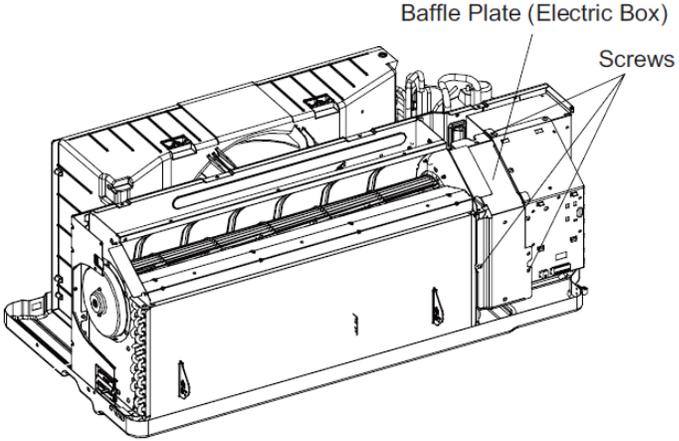
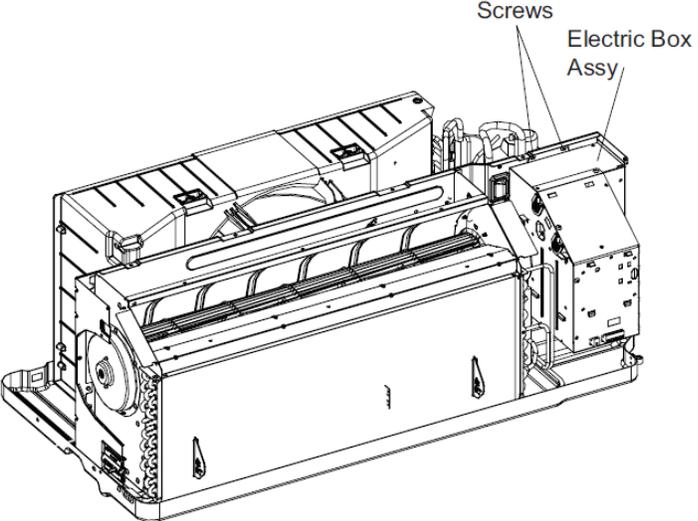
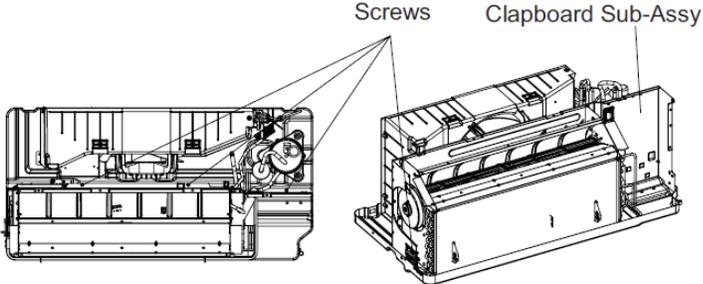
Be sure to wait 10 minutes or more after turning off all power supplies before disassembling work.

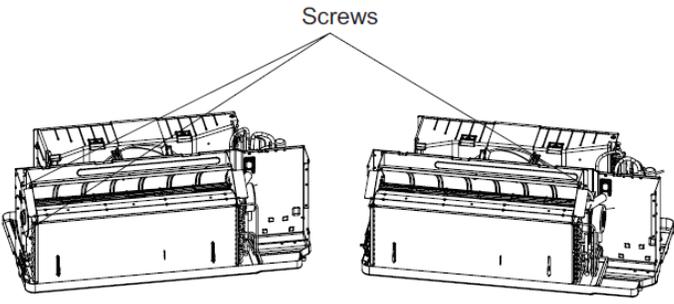
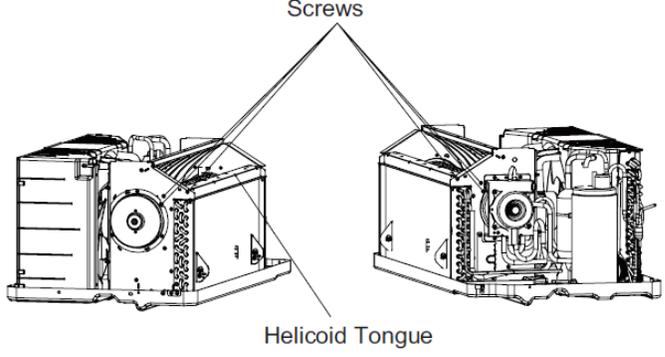
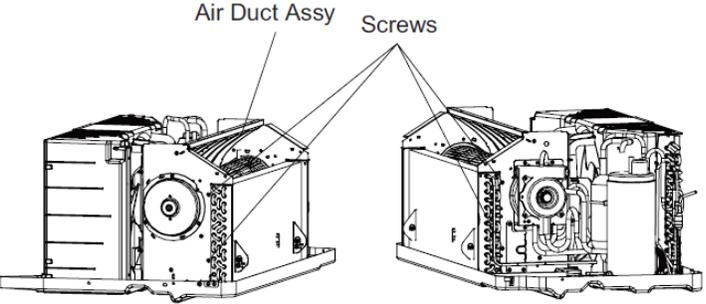
Note: The procedure below is for heat pump unit with electric heating. There is some difference between it and cooling only unit with electric heating. The difference is pointed out in the diagram; please refer to the related diagram direction.

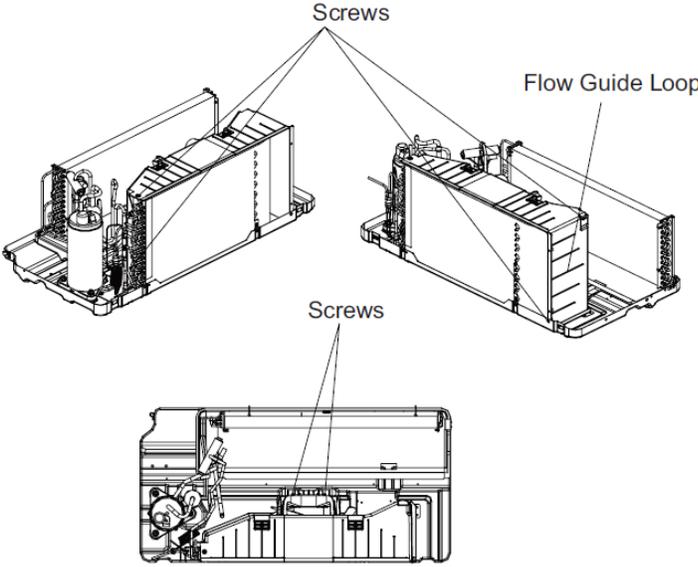
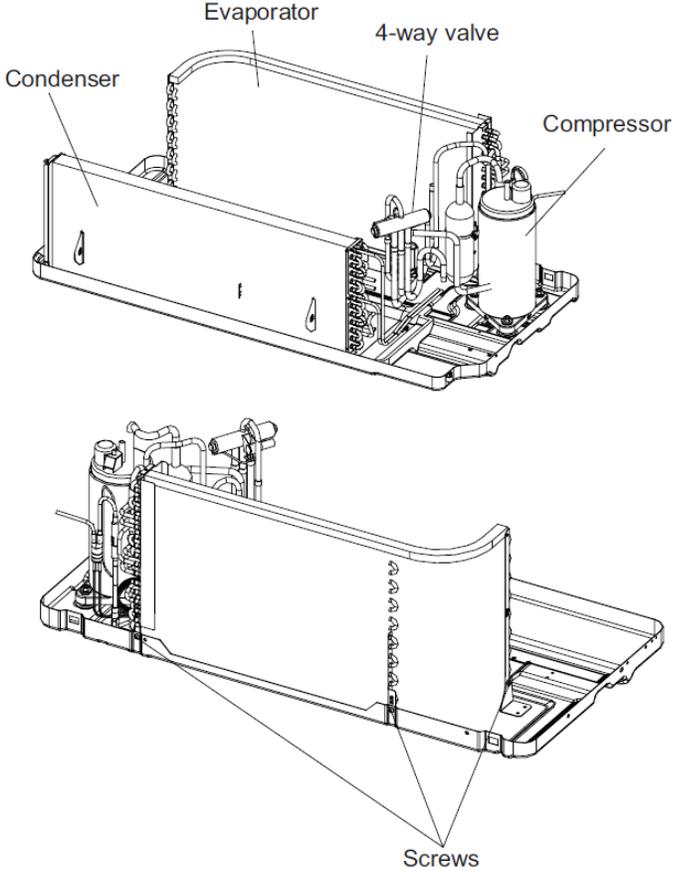
Steps	Procedure
1.Remove panel	
a	<p>Hold the panel and pat both sides of panel to separate the panels and then remove the front panel.</p> 
b	<p>Hold the front part of filter by hand, lift up the filter and then remove the filter.</p> 

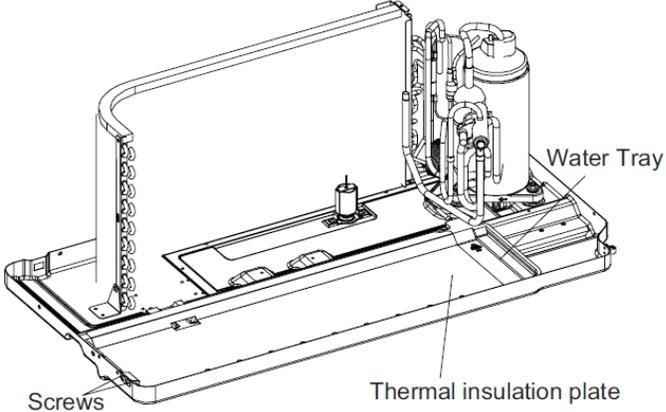
Steps	Procedure	
<p data-bbox="224 258 673 289">2.Remove middle connection board</p>	<p data-bbox="337 405 760 495">Press the 2 clasps of filter to make it separated from the groove and then pull the filter outwards to remove it.</p>	 <p data-bbox="1128 268 1388 294">Middle connection board</p> <p data-bbox="1003 321 1079 346">Screws</p>
<p data-bbox="224 825 662 856">3.Remove Outer Support Sub-assy</p>	<p data-bbox="329 951 747 1003">Remove 6 screws on outer support and then remove the outer support.</p>	 <p data-bbox="1120 982 1193 1008">Screw</p>
<p data-bbox="224 1266 503 1297">4.Remove Baffle Plate</p>	<p data-bbox="329 1392 711 1444">Remove 1 screw on baffle plate and remove the baffle plate.</p>	 <p data-bbox="1331 1465 1453 1491">Baffle Plate</p> <p data-bbox="1421 1732 1485 1757">Screw</p>

Steps	Procedure	
<p>5.Remove Rear Grill</p>	<p>Remove 6 screws on rear grille and then remove the rear grille.</p>	 <p>Screws</p> <p>Rear Grill</p>
<p>6.Remove Top Cover Sub-Assy</p>	<p>Remove 4 screws on top cover sub-assy and then remove the top cover sub-assy.</p>	 <p>Top Cover Sub-Assy</p> <p>Screws</p>
<p>7.Remove LCD Cover Sub-assy</p>	<p>Remove 1 screw on the control cover plate sub-assy and then remove the control cover plate sub-assy.</p>	 <p>LCD Cover Sub-assy</p> <p>Screws</p>

Steps	Procedure	
	<p>8.Remove Baffle Plate (Electric Box)</p> <p>Remove three screws on baffle plate (electric box) and then remove the baffle plate (electric box).</p>	
	<p>9.Remove Electric Box Assy</p> <p>Remove two screw on electric box, hold the bottom part of electric box and move it upwards to separate the clasps, and then remove the electric box.</p>	
<p>a</p>	<p>10.Remove Clapboard Sub-Assy</p> <p>Remove 4 screws on isolation sheet sub-assy and chassis sub-assy, and 3 screws on isolation sheet sub-assy and air duct, and then remove the clapboard sub-assy.</p>	

Steps	Procedure	
b		
11.Remove Helicoid Tongue		
	Remove 6 screws on helicoid tongue and then remove the helicoid tongue.	
12.Remove Air Duct Assy		
	Remove 4 screws on air duct and then remove the air duct.	

Steps	Procedure
<p>13.Remove Flow Guide Loop</p>	<p>Remove 3 screw on flow guide loop and chassis, and three screws on condenser, and then remove the flow guide loop.</p> 
<p>14.Remove condenser and evaporator</p>	<p>Remove the 3 screws fixing the Evaporator; unsolder the welding joints of the suction pipe, discharge pipe, compressor, 4-way valve with the condenser and evaporator, and then remove the condenser and evaporator. (before unsoldering, discharge the refrigerant in the pipeline completely)</p> 

Steps	Procedure
<p data-bbox="207 247 703 310">15.Remove thermal insulation plate and Water Tray</p>	<p data-bbox="342 375 756 464">Remove 2 screws on thermal insulation plate and then remove thermal insulation plate and water tray.</p> 
<p data-bbox="207 842 764 867">16.Remove Drainage Valve and Compressor</p>	<p data-bbox="350 957 740 1066">Remove 3 nuts on compressor and 2 screws on drainage valve, and then remove compressor and drainage valve.</p> 