daitsu

SERVICE MANUAL

APD-12A

CONTENTS

1. PREFACE

This SERVICE MANUAL provides various servicing information, including the mechanical and electrical parts, etc. This room air conditioner was manufactured and assembled under a strict quality control system.
The refrigerant was charged at the factory. Be sure to read the safety precautions prior to servicing the unit.

1.1 SAFETY PRECAUTIONS

1. When servicing the unit, set the POWER SWITCH to OFF and unplug the power cord.
2. Inspect the service cord for damage or wear.
   If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
3. After servicing the unit, make an insulation resistance test to protect the customer from being exposed to shock hazards.

1.2 INSULATION RESISTANCE TEST

1. Unplug the power cord and connect a jumper lead between the two (2) live pins.
2. The grounding conductor (yellow/green) is to be open.
3. Measure the resistance value with an ohm meter between the jumped lead and each exposed metallic part on the equipment at all the positions (except OFF) of the ROTARY SWITCH or POWER SWITCH.
4. The value should be over 1MΩ.

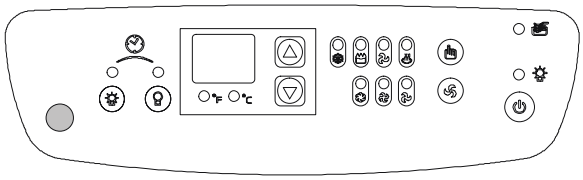
1.3 FEATURES

Water full alarm
Anti-icing function at cooling mode.
Restart relay protection for the compressor.
Temperature sensor err self-diagnose.

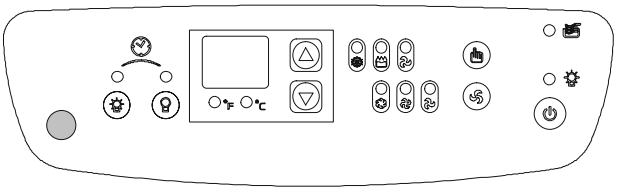
24 hours on/off mode time setting.
Both temperature mode display
Separate motor for indoor and outdoor system.
Multiple uses: dehumidifying and cloth drying.
Low temperature Drying operation.
There are four casters on the bottom for easy movement.
Only one exhaust pipe, which makes the A/C easier to use.
Remote-controlled or gentle-touch keys for easy and comfortable use.
Compressors of famous brands are adopted for reliability and low noise.
The heating system uses PTC electrical heater and will not be affected by ambient temperature, which saves energy.
Suitable for local cooling and heating.
Condenser shower and large volume tank design.
Long time to pour the tank.
Directly drainage available.

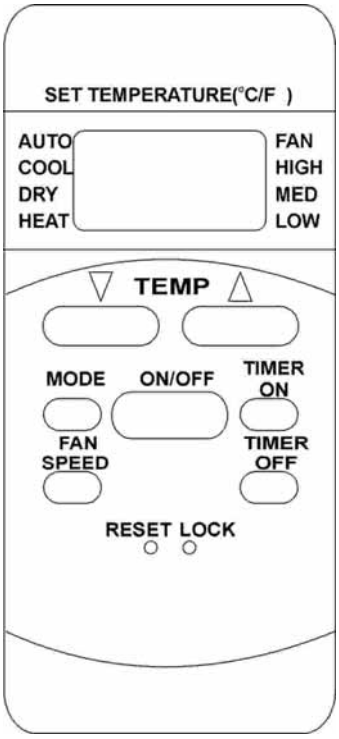
1.4 CONTROL LOCATIONS

For cooling only with electric heater models:



For cooling only models:





Remote receiver.

Timer ON button. Push this button to set the Timer On time.

Timer OFF button. Push this button to set the Timer Off time.

Timer ON/OFF lamp.

°F Fahrenheit temperature display. When Fahrenheit temperature display mode is selected.

°C Celsius temperature display. When Celsius temperature display mode is selected.

Temperature setting up. Push this button to set temperature setting up.

Temperature setting down. Push this button to set temperature setting down.

Cooling operation lamp.

Drying operation lamp.

Fan only operation lamp.

Electric heating operation lamp.

Mode setting button. Push this button to select the operation mode: Cool, Dry, Fan only and Heat

High fan speed lamp.

Med fan speed lamp.

Low fan speed lamp.

Fan speed setting button. Push this button to select fan speed: High, Med and Low.

Power button. Push this button to start the unit.

Water full alarm lamp

Power lamp

Remote controller:

LCD display.

Mode button: Select the operation mode, AUTO, COOL, DRY, HEAT (cooling only with electric heater models only) and FAN.

Fan speed button: Select the Fan speed, AUTO, LOW, MED, HIGH.

ON/OFF button: Press this button to operation the unit, again to stop.

Temperature setting up button: Press this button to increase temperature setting or adjust the TIMER in a clockwise direction.

Temperature setting down button: Press this button to decrease temperature setting or adjust the TIMER in a counter-clockwise direction.

Timer on button: Push this button to set the ON timer.

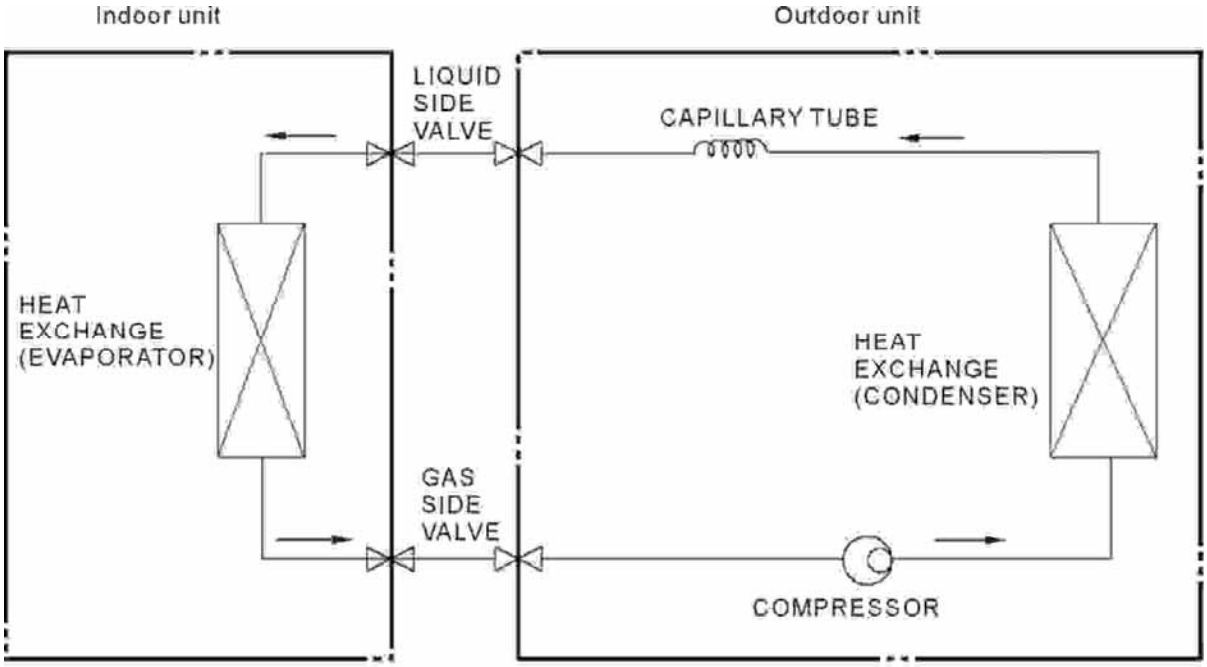
Timer off button: Push this button to set the OFF timer.

Lock button: Press this button to lock all button except this button.

Reset button: Press this button to reset all settings to factory settings.

2 TROUBLESHOOTING GUIDE

2.1 REFRIGERATION CYCLE DIAGRAM



2.2 ELECTRICAL FUNCTION

2.2.1 Electric Control working environment

2.2.1.1 Input voltage: 187~264V for 50Hz models and 97~127V for 60Hz models;

2.2.1.2 Input power frequency: 50Hz or 60Hz;

2.2.1.3 Ambient temperature: -7°C~+43°C for cooling only with electric heater models and 10°C~+43°C for cooling only models;

2.2.1.4 Indoor fan normal working amp is less than 1A;

2.2.1.5 Outdoor fan. Normal working amp is less than 1.5A;

2.2.1.6 Compressor: single-phase power supply. Its normal working amp is less than 10A;

2.2.2 Proper symbols and their meanings:

TA: Indoor ambient temperature

TC: Indoor evaporator temperature

TS: Setting temperature through the remote controller

2.2.3 Systematic functions

Remote receiving (Optional)

LED displaying and alarm

On or off Timer

Protection for the compressor

Water full alarm

Anti-icing function at cooling mode.

Temperature sensor err self-diagnose.

Both temperature mode display

2.2.4 Protection

2.2.4.1 The compressor functions protection with a delay of three minutes.

2.2.4.2 Sensor protection at open or short circuit.

2.2.4.3 Evaporator anti-icing protection at cooling mode.

2.2.4.4 Water full alarm

There are two water position switches used in the unit. One detects the water depth in the chassis and the other detects the water in the tank.

2.2.4.4.1 Water full alarm will be on when the unit is standing by or operating.

2.2.4.4.2 When the water adds up to the first position on the chassis, the pump will be activated. If the water drops down through the position, the pump will be on and stop after 2 minutes.

2.2.4.4.3 When the water adds up to the position on the tank, the compressor, outdoor fan motor, electric heater and pump will stop operation. And the LED will display “P1” while the water full lamp flashes at 2Hz.

2.2.4.4.4 When the water adds up to the second position on the chassis and the switch has been on for 10 seconds, the whole unit will stop operation. The LED will display “P2” and the water full lamp will flash at 5Hz. After you have clear the problem, you should unplug the unit and plug again. Then the unit will be ready to operate.

2.2.4.4.5 When the unit is standing by, if the unit displays “P1”, the pump will not operate. After the problem is cleared, the unit will be ready to operate. But if you push the power button, the unit will shut the “P1” display and shut down.

2.2.5 Fan-only Mode Function Requirement

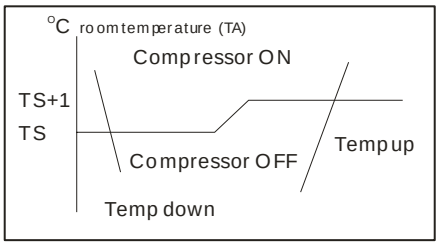
2.2.5.1 The compressor and outdoor fan are OFF at Fan-only mode.

2.2.5.2 The speed of indoor fan can be optionally chosen as High/Mid/Low.

2.2.6 Cooling Mode Function Requirement

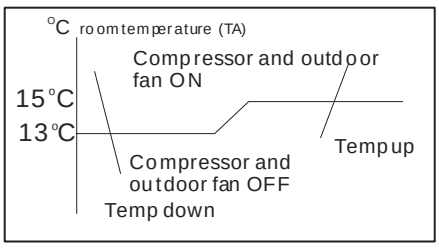
2.2.6.1 The speed of indoor fan can be optionally selected as High/Mid/Low.

2.2.6.2 The compressor operate as:



2.2.7 Drying mode

2.2.7.1 When the unit starts to operate in Drying mode, the compressor will start while the room temperature is over 13°C. After the compressor started, the compressor will operate as:

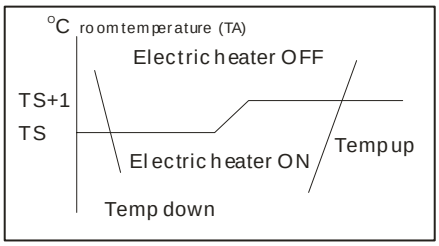


2.2.7.2 The indoor fan will operate with high speed. The outdoor fan will operate with compressor.

2.2.8 Heating mode

2.2.8.1 The speed of indoor fan can be optionally chosen as High/Mid/Low.

2.2.8.2 Electric heater operate as :



2.2.9 Temperature display

2.2.9.1 The setting temperature will be displayed in Cooling and Heating mode. The room temperature will be displayed in Drying and Fan only mode.

2.2.9.2 The setting temperature range is from 17°C to 30°C or 62°F to 88°F. The display temperature range is from 10°C to 35°C or 48°F to 98°F. If the room temperature is lower than 10°C or 48°F, the display will be 10°C or 48°F.

2.2.10 Timer Function

2.2.10.1 The maximum length of Timer is 24 hours and the minimum is 0.5 hours.

2.2.10.2 TIMER ON function: first turn OFF the unit, the unit will be automatically ON at the set time.

2.2.10.3 TIMER OFF function: first turn ON the unit, the unit will be automatically OFF at the set time.

2.2.10.4 TIMER ON/OFF function (ON TIMER is earlier than OFF TIMER): first turn OFF the unit, it will be automatically ON at set time, and later be OFF at the set time.

2.2.10.5 TIMER OFF/ON function (OFF TIMER is earlier than ON TIMER): first turn ON the unit, it will be automatically OFF at set time, and later be ON at the set time.

2.2.10.6 Timer function execution is applicable upon one operation only.

2.2.10.7 Timer precision is less than 15 minutes.

2.2.11 Auto restart function

In case of a sudden power failure, this function automatically sets the unit to previous settings before the power failure when power returns.

2.3 TROUBLESHOOTING GUIDE

In general, possible trouble is classified in three kinds. One is called Starting Failure which is caused from an electrical defect, another is ineffective Air Conditioning caused by a defect in the refrigeration circuit and improper application, and the other is called the Structure Damage.

ROOM AIRCONDITIONER VOLTAGE LIMITS:

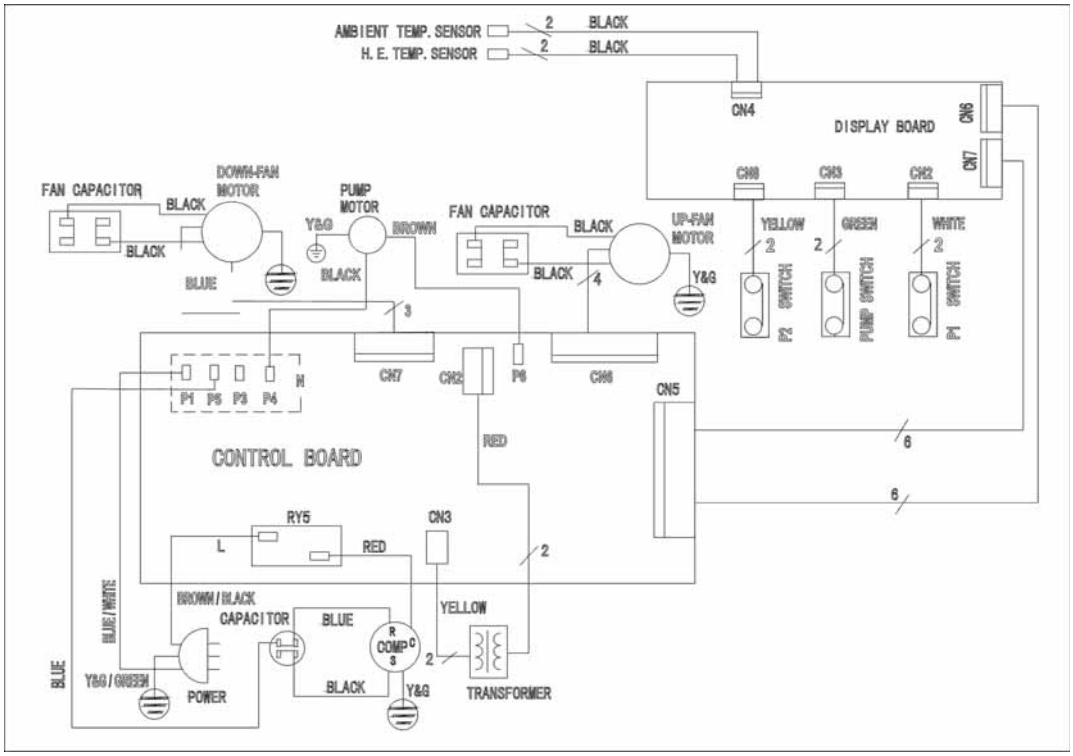
NAMEPLATE RATING	MINIMUM	MAXIMUM
220~240V	196V	253V
115V	103V	122V

PROBLEM	POSSIBLE CAUSE	REMEDY
No power display on panel or any one of the buttons failure.	Power failure	Check the power supplier if the power supplier is supplied to the unit. Check the power cord and correct if damaged.
	Transformer (Discharge transformer before testing)	Check resistance between the two input/output lines on transformer. Replace the transformer if either of the input/output is open or the transformer is damaged.
	Display board or main PCB failure	Check the voltage on display board. Replace the display board if it is +5V else replace the main PCB.
Remote control failure.	Battery failure	Check the voltage of battery. Replace batteries if the voltage is lower than 2.3V.
Fan motor runs intermittently	Cycles on overload.	Check voltage. Call an electrician if not within limits.
		Test capacitor. Replace if not within +/-10% of manufacture's rating.
		Check bearings. Replace the motor if the blower wheel cannot rotate freely.
		Pay attention to any change from high speed to low speed. Replace the motor if the speed does not change.
Compressor stops instantly after startup.	Refrigerant	The amount of the refrigerant is too much, making the compressor load too big. Recycle and recharge the refrigerant after checking for the reason.
	Compressor	The compressor is blocked inside. Replace after checking for the reason.

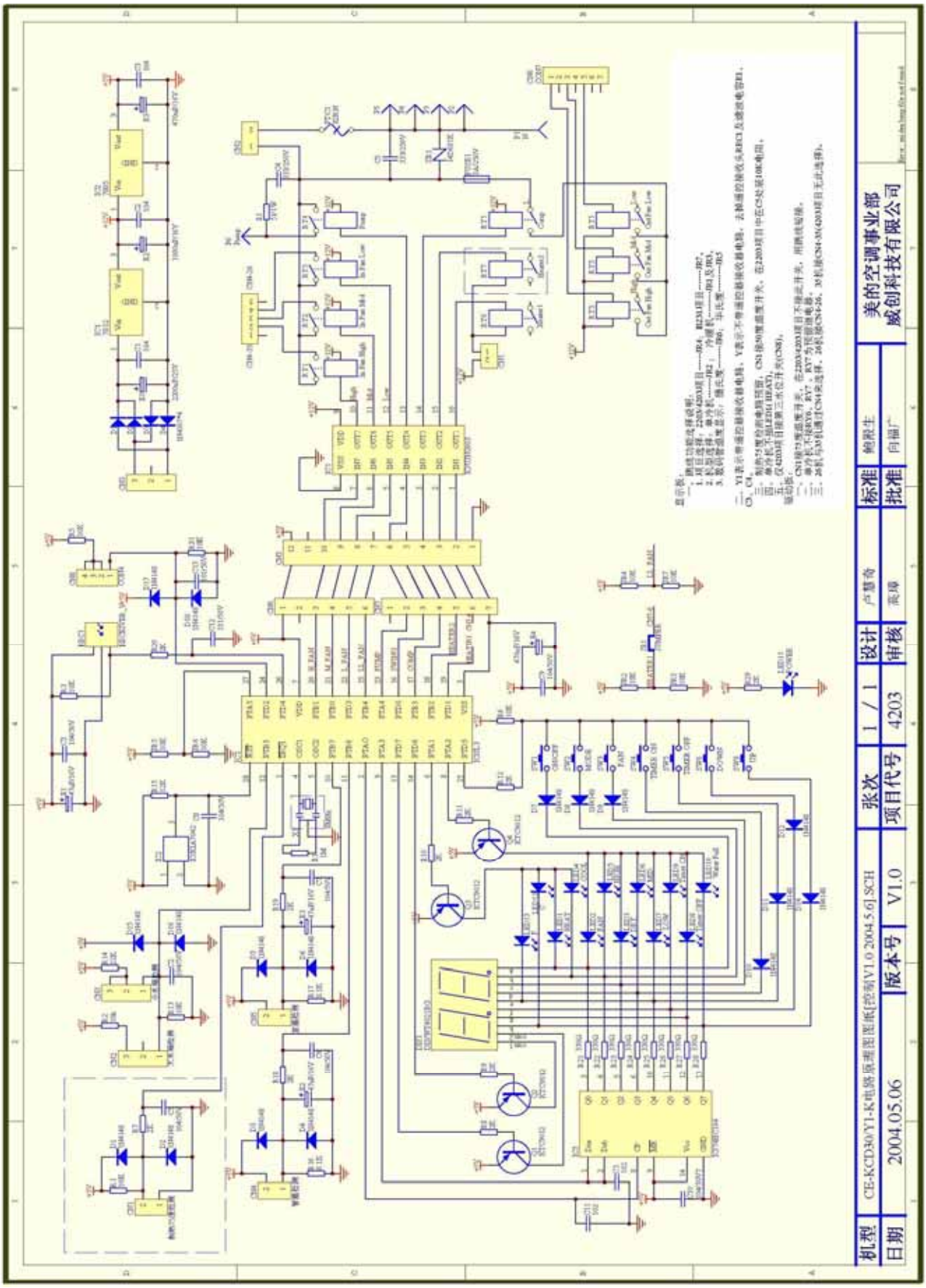
Fan motor will not run.	No power	Check voltage at electrical outlet. Correct if none.
	Water alarm	Check and correct if water alarm happens.
	Power supply cord	Check voltage at the power cord terminal on Main PCB. Replace the power cord if none.
	Transformer (Discharge transformer before testing)	Check resistance between the two input/output lines on transformer. Replace the transformer if either of the input/output is open or the transformer is damaged.
	Wire disconnected or connection loose	Connect wire. Refer to wiring diagram for terminal identification. Repair or replace loose terminal.
	Main PCB failure	Select fan speed and Check the voltage on main PCB. Replace the main PCB if no voltage in anyone.
	Capacitor (Discharge capacitor before testing)	Test capacitor. Replace if not within +/-10% of manufacture's rating. Replace if shorted, open or damaged.
	Will not rotate	Fan blower hitting scroll. Realign assembly. Check fan motor bearings. Replace the motor if motor shaft do not rotate.
Fan motor noise.	Fan blower	Replace the fan blower if cracked, out of balance, or partially missing.
	Loose screws	Tighten them.
	Worn bearings	Replace the motor if knocking sounds continue when running or loose, or the motor hums or noise appears to be internal while running.
Compressor will not run while fan motor runs.	Voltage	Check voltage. Call Supply Authority if not within limits.
	Wiring	Check the wire connections, if loose, repair or replace the terminal. If wires are off, refer to wiring diagram for identification, and replace. Check wire locations. If not per wiring diagram, correct.
	Main PCB failure	Check voltage of main PCB. Replace the main PCB if open.
	Capacitor (Discharge capacitor before testing)	Check the capacitor. Replace if not within +/-10% of manufacturers rating. Replace if shorted, open, or damaged.
	Room temp sensor	Check the temperature setting if not at the coolest (in cooling mode) or the warmest (in heating mode). Set it if not.
	Compressor	Check the compressor for open circuit or ground. If open or grounded, replace the compressor.
Excessive noise.	Copper tubing	Remove the cabinet and carefully rearrange tubing not to contact cabinet, compressor, shroud and barrier.
Water full alarm	Water tank full	Check and pour if the water tank is full.
	Water depth sensor if failure	Check and replace if failure.
	Water pump failure	Check and replace if the pump if failure.
	Water depth is over load in chassis	Check and drainage the water in the chassis by open the drainage hose on the chassis.
	Water depth sensing structure	Check and replace or realign if the structure is failure.

Cooling or heating feels not good	Air filter	Clean or replace if restricted.
	Air discharge pipe	Realign and assemble if the installation of the air discharging pipe failure. Replace if damaged.
	Unit undersized	Determine if the unit is properly sized for the area to be cooled or heated.
	Condenser and Evaporator	Clean or replace if restricted.
	Water shower failure	Check the structure of water showering system and clean if blocked.
	Fan motor	Check the fan capacitor and replace if not within +/-10% of manufactures rating.
	Air flow	Clean or remove if any barrier is found to block the inlet/outlet wind flow of the unit.
	Less refrigerant	Check the tubes for reasons of leakage. Recycle the refrigerant, correct the leakage points and recharge.
	Capillary tube	Regulate the flow if capillary tube and make the evaporating temperature appropriate if the evaporator is frosted. Replace if blocked. Repair joint if leaking.
	Compressor	The inlet and outlet valve of the compressor is damaged, making the low pressure connected with the high pressure. The refrigerating system can not produce high pressure and low pressure. Replace the compressor after checking for the reason.
	Heat sources	Reduce if too many.
No cooling or heating.	No power	Check the voltage. Call an electrician if no within the limit.
	Wiring	Check the terminals. Repair and correct if loose.
	Temperature setting	Check and adjust the temperature setting.
	Mode setting	Check and adjust the mode setting.
	Compressor	Check and replace if the compressor, the over-load protector or wiring is broken.
	Electric heater failure	Check and replace if the heater is damaged.
	Over heat fuse failure	Check and replace if the fuse is damaged.
	Main PCB	Check the voltage of main PCB. Replace the main PCB when the unit failure in heating mode.
The unit starts and stops frequently.	Power supply	The input power supply voltage is too low. Call an electrician if not within limits.
	Main PCB	Check and replace the main PCB if the compressor relay on PCB is shorted or damaged.
	Room temperature	When the room temperature is too high, the compressor will protect.

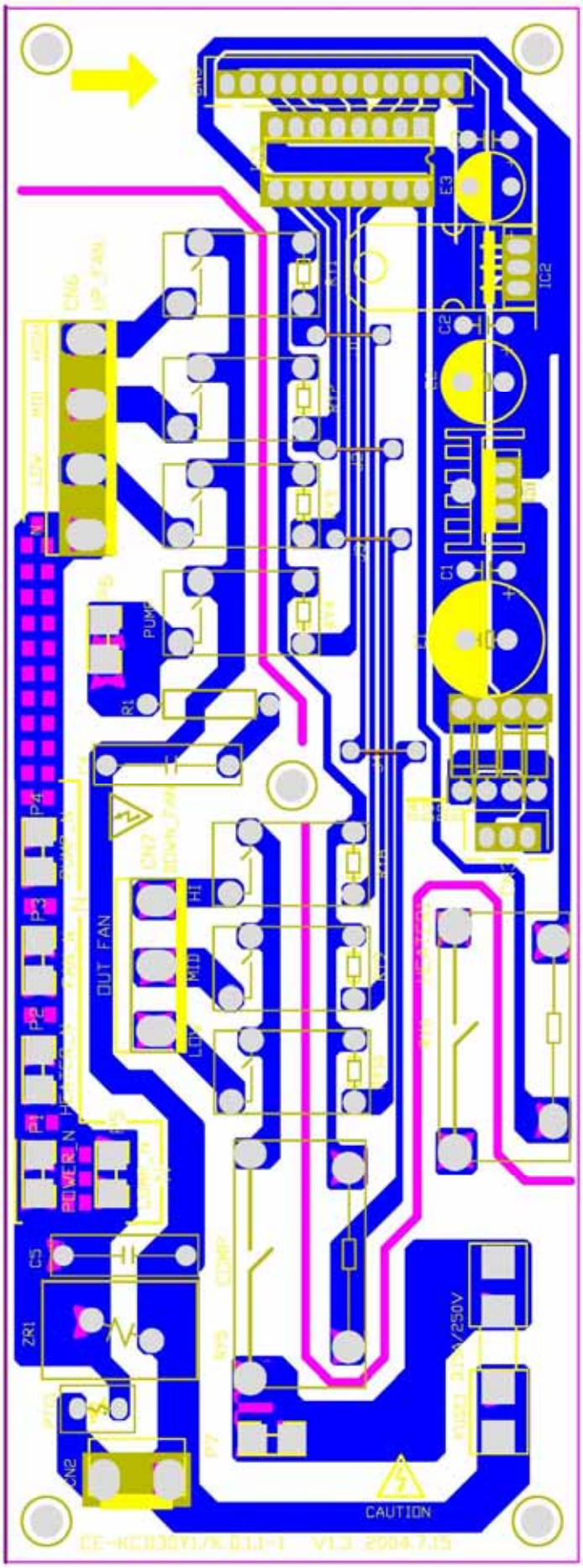
Wiring diagram APD 12A



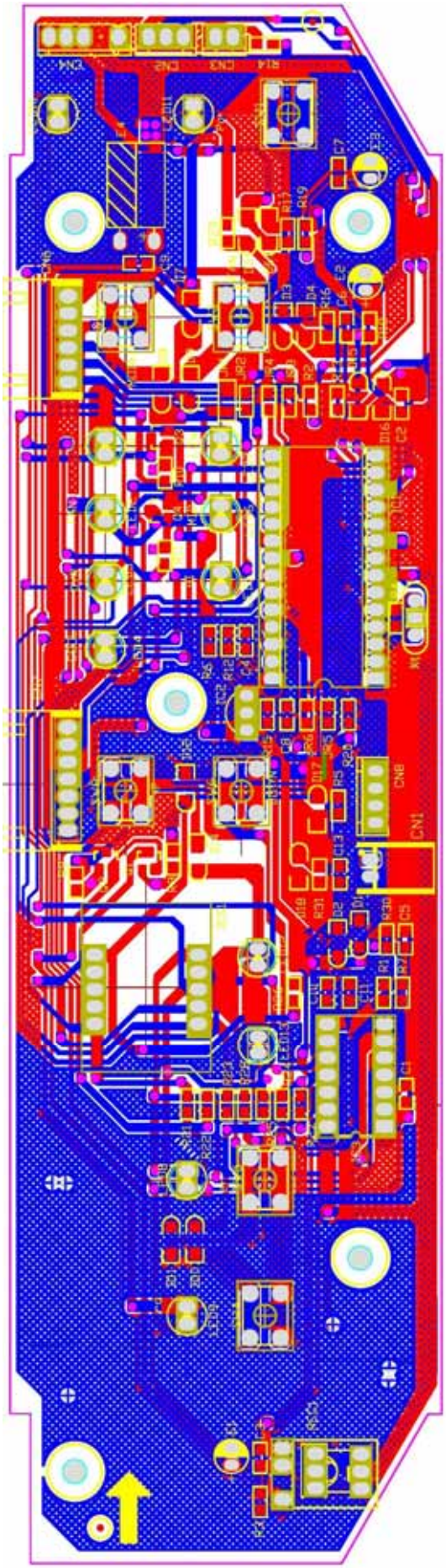
3.3 ELECTRICAL CONTROL SCHEME:



3.4 MAIN CONTROL BOARD SCHEME:



3.5 DISPLAY BOARD SCHEME:

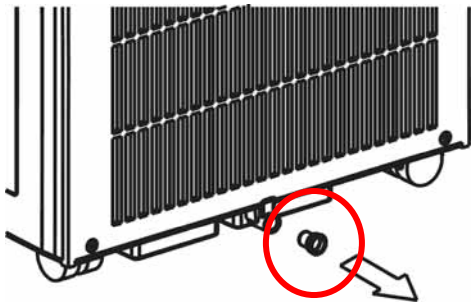


4 HOW TO DISASSEMBLE THE UNIT

4.1 Prepare the unit.

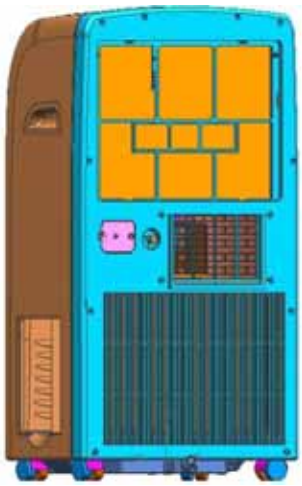
Unplug the power cord and disconnect the Air pipe from rear of the unit.

Move the unit to a replace where water can be poured. Remove the rubber plug from back of the unit and drainage the water in from the unit.



Remove the water tank from the unit and pour the water in the tank.

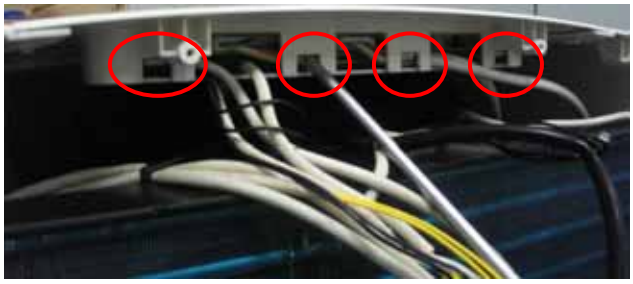
4.2 Remove the screws which fixed the rear panel.



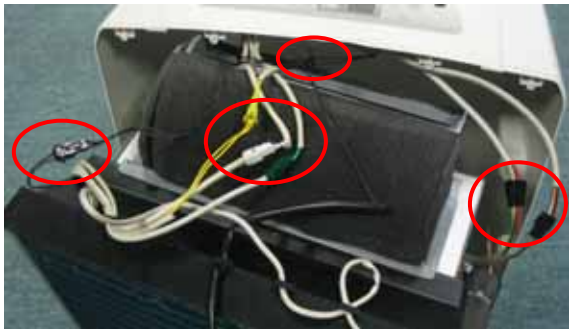
Remember to disassemble the inlet grille.

Take care to the indoor temperature sensor attached on the rear board. And be care to the power cord which got through the rear panel.

4.3 To disassemble the display board assembly, just push the clasp and release the assembly.



Now it is easy to replace the display board. Take care to release the connector which connected to the display board.



4.4 To disassemble the front panel. Remove the screws fixing the front panel.

Screws fix the front panel from side of the unit.

Screws on front bottom of the unit.

Screw locates on top of tank box.

Screw locates on bottom of chassis.

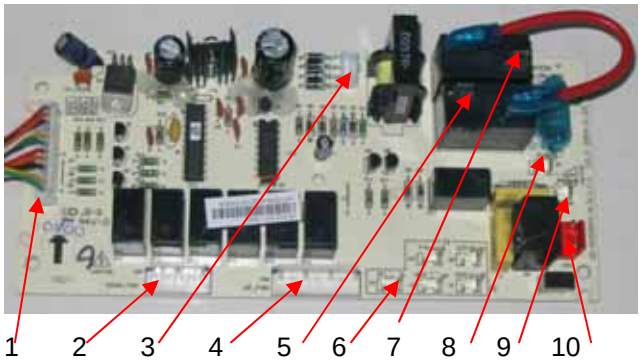
Be care to release the connectors which connect to the display board.

4.5 To replace the Main Control board.

Remove the screws fixing the enclosure cover.

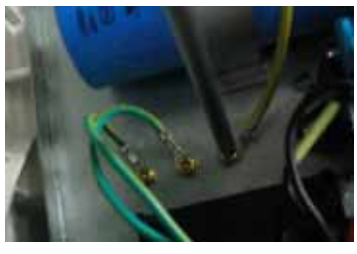
Take care of the wiring diagram on the cover. The wiring diagram is important for reference when wiring.

Pay attention to the wires in the enclosure.



1: Terminate to display board
2: Terminate to condenser fan motor
3: Out-put of transformer
4: Terminate to evaporator fan motor
5: Terminate to compressor
6: Terminates (N) to condenser fan motor, electric heater, pump, power cord, compressor capacitor
7: Terminate to electric heater
8: Terminate (L) to power cord
9: Terminate (L) to pump
10: Terminate to input of transformer

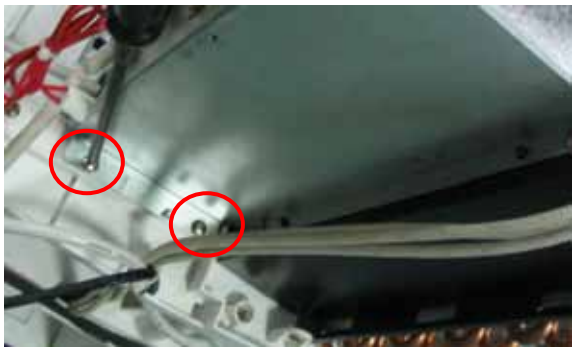
Take care to the grounding wires if need to disconnect.

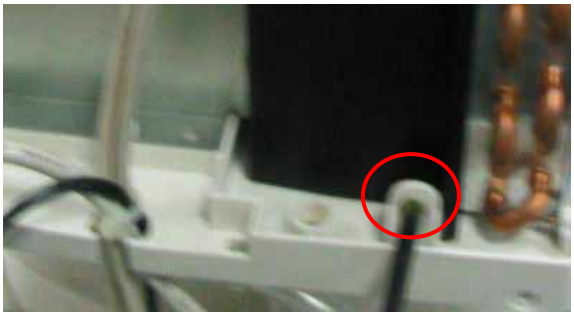


4.7 To replace the evaporator fan motor or electric heater

To disassemble the air-out frame. Remove the screws fixing the air-out frame. Lift the frame up then pull the frame forward.

Remove the screws fixing the fan shell box.

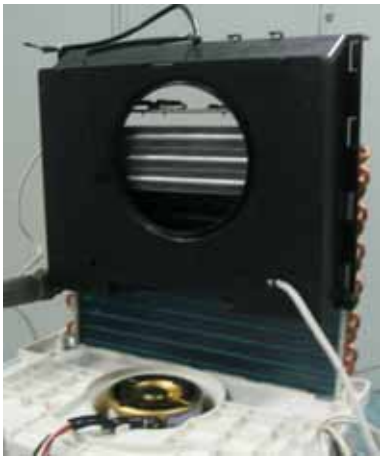




Remove the fan motor, fan scroll and blower wheel from the unit.

Take care to the wires for electric heater.

Slide the electric heater bracket up and remove the parts from the unit.



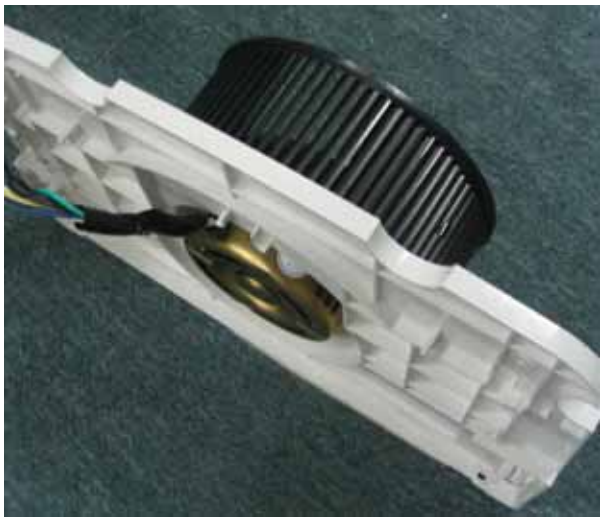
Now, it is easy to replace the electric heater and/or heat protector attached with the heater.

4.8 To replace the condenser fan motor

Remove the screws fixing the evaporator

Remove the screws fixing the condenser fan motor bracket.

Then remove the bracket with condenser fan motor and blower wheel from the unit.

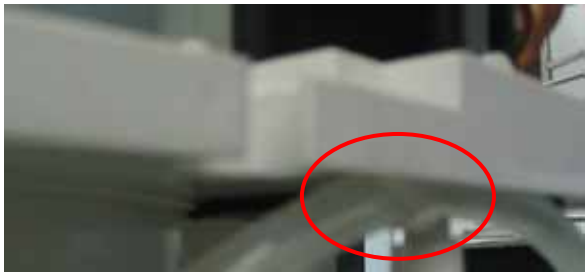


4.9 To repair the refrigerant system or replace the compressor

Disconnect the water pipe below.

Remove the screws fixing the condenser fan scroll.

Remove the water pipe from the cover.



Then, remove the condenser fan scroll.

Now, it is easy to repair the refrigerant system.

4.10 To repair the water disposal system or replace the water depth switch or the pump.

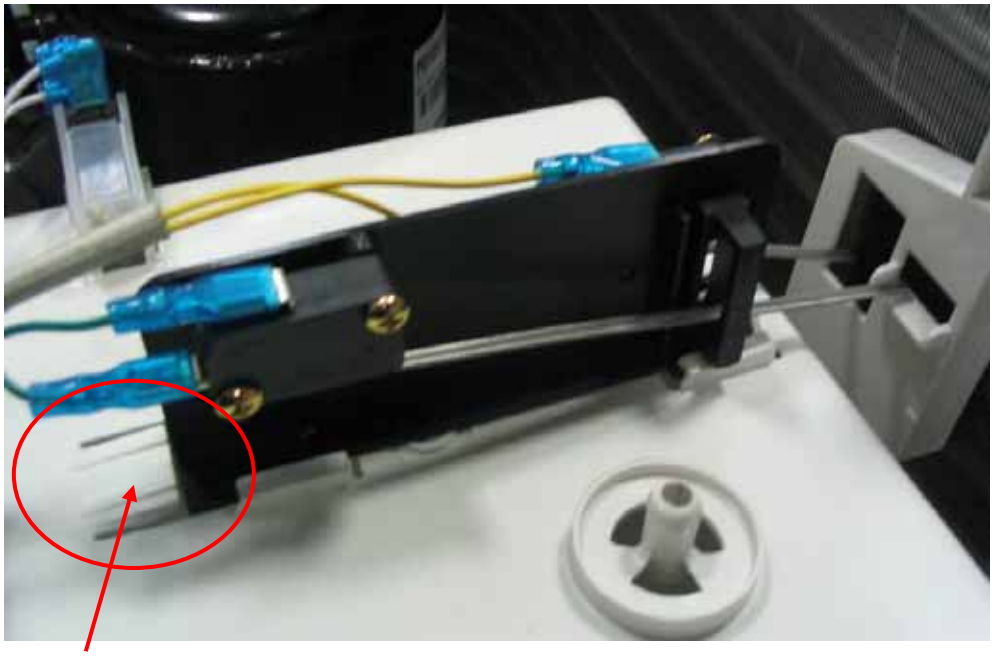
Remove the screws fixing the supporting board.

Remove the screw fixing the pump clamp.

Now, remove the pump and replace.

Remove the screw fixing the water switch which controls the water in tank.

Press the clamp fixing the water switches which control the water in the chassis.



Press downward here

Then remove the screws fixing the switches and replace. Pay attention to the holes. Don't install into wrong holes.