Portable Air Conditioners SERVICE MANUAL

WPC-15000S



Service Manual

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GENERAL DESCRIPTION

General air conditioning system

- 1) conventional air conditioners cool the entire enclosed environment.
- 2) They act as "heat exchangers", equiring an interior unit (evaporator) to blow cool air into the interior and an exterior unit (condenser) to exhaust exchanged heat to the outdoors.



Portable air conditioning system

- The WPC-15000S is a spot cooler which directs cool air to particular areas or objects.
- 2) The WPC-15000S has the following features.
- 3) The innovative design of the WPC-15000S has resulted in one compact unit, replacing the need for two separate units.
- 4) With the whole cooling system built into one compact unit, the WPC-15000S requires no piping and can be easily transported and installed.
- 5) The WPC-15000S is economical because it cools only the area or objects which need to be cooled.



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SPECIFICATIONS Exterior Dimension Diagram (WPC-15000S)



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SPECIFICATIONS Exterior Dimension Diagram (WPC-15000S)



Technical Specifications

Specifications		WPC-15000S		
Power Supply Ph-V-Hz		Single Phase, 220V, 60Hz		
Cooling Capacity Btu/h		60,000		
Power Consumption Watt	S	6,260		
Rated Current Amps		28.49		
EER Btu/Wh		9.58		
Nema Plug		6-50P		
Power Cord Gauge AWG		8		
Power Cord Length ft		6		
Dimensions W x D x H - in	. (mm)	28.1 x 43.3 x 55.2 (715 x 1100 x 1401)		
Weight (Net/Gross) Lbs(kg	g)	518/535.7 (235 / 243)		
Condensate tank Gallons(Liters)	Auto Pump Included		
No. of Cool Air Outlets Pcs	5	3		
Ambient temperature range °F(℃)		64 ~ 113 (18~45)		
Setting temperature (Room cool mode) °F(°C)		64 ~ 86 (18 ~ 30)		
Setting temperature (Spot cool mode) °F(°C)		32 ~ (0 ~)		
Application Area (Room cool mode) ft²(m²)		1,720(160)		
Refrigerant Type / oz(g)		R-410A / 98.8 (2,800)		
Design Pressure Hi/Low Ps	sig	465 / 250		
Indoor Air Flow CFM(CMN	⁄1)	1,700 (48)		
Wheels pcs / diameter		4 / 127 mm		
Hot Air Duct Diameter in. (mm)		20 (500)		
Maximum Duct Length ft(m)		100 (30)		
Safety Devices	Compro tank sw delay p	pressor overload protector, Anti-freezing thermister, Full drain switch, Automatic restart (Power interruption), Compressor time program, High pressure switch		
Features	Tempe display include	perature control, Self-diagnostic function, Washable filters, °F(°C) ay, Off-timer, Drain pump installed , 20" Hot air exhaust flange ded		

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CONSTRUCTION Internal Structure (WPC-15000S)



REFRIGERANT SYSTEM CONSTRUCTION



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Compressor

A scroll compressor is a piece of machinery inside your HVAC unit that compresses gaseous refrigerant so that it can pass through your refrigerant coil and be sent into your home to cool the air. A scroll compressor is a type of compressor that uses two interlaced spiral metal pieces (or scrolls) instead of pistons to compress the refrigerant.

The scroll compressor works by using a pair of scroll-shaped elements, with one scroll orbiting within the other scroll. As the outer scroll rotates, it draws in the gas and compresses it as it moves inward. This action creates pressure on the gas, thus resulting in increased temperature.



Compressor operation

- 1) Start of compression
 - 1) The cylinder is filled with low pressure gas.
- Since pressure in the discharge chamber is higher than in the cylinder, the discharge valve is kept closed.
- 2) Suction and compression
- 1) The pressure in the cylinder increases gradually.
- 2) Refrigerant suction begins on the suction side of the cylinder.
- 3) The discharge valve remains closed.
- 3) Discharge
 - 1) The pressure in the cylinder exceeds that in the discharge chamber, and the discharge valve opens.
- 2) On the suction side, refrigerant suction continues.
- 4) Completion of compression
 - 1) When compression is completed, all of the refrigerant has been drawn from the suction chamber.
 - 2) Operation then returns to step 1)(Start of compression) and the above process of suction and compression continues repeatedly in succession.



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Compressor lubrication

The lubrication system is comprised of a hollow shaft, an oil scraper mounted at the end face, hollow shaft, a shaft journal (shaft bearing), and the lubrication groove for the shaft journal.

The lubrication groove is wider than the oil hole. When the shaft turns, oil is scraped upward by the oil scraper along the inside diameter of the hollow shaft. The oil is fed through the oil hole by centrifugal force, then supplied to the lubrication groove for each shaft journal, lubricating the bearing. In this lubrication system, oil enters into

each bearing separately and returns to the oil reservoir. This system effectively prevents bearing temperature increases, and offers high reliability.

In addition, the specially treated shaft journal keeps the bearing from being

damaged during high temperature operation.



Condenser

- 1) The condenser is a heat exchanger with Louver fins.
- 2) Heat is given off and absorbed by air being pulled across the condenser fins by the fan. The air is then expelled through the condenser air outlet.





Expansion valve

A thermostatic expansion valve is a refrigeration and air conditioning throttling device that controls the amount of refrigerant liquid injected into a system's evaporator—based on the evaporator outlet temperature and pressure



Evaporator

The evaporator is a heat exchanger covered with slit fins. Heat is removed from the air being pulled across the evaporator by the fan.

The resulting cool air is expelled through the cooling air ducts.



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ELECTRICAL SYSTEM Circuit Diagram (WPC-15000S)



Control panel

Before operating the unit, it is important to be familiar with the basic operation of the control panel.



1. POWER BUTTON

- Activates unit when POWER BUTTON is pressed.
- Fan starts on low speed.
- If POWER BUTTON is pressed during operation, unit stops.

2. BLOWER BUTTON

• Changes fan speed from LOW to HIGH when pressed.

3. SPOT / COOL BUTTON

- Activates compressor and begins producing cool air 5 seconds after button is pressed.
- Regulates temperature based on outlet cool air temperature.

4. ROOM / COOL BUTTON

- Activates compressor and produces cool air 5 seconds after button is pressed.
- Regulates temperature based on inlet ambient air temperature.

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5. SET TEMP BUTTON

- Change target temperature / data value by ± 1.
- Change data value by ± 10 by pressing continually.
- Press the SET TEMP BUTTONS to set temperature.
- Upper button is to heighten temperature and Lower button is to lower temperature.

6. ALARM

- Alarm indicator light blinks and indicates abnormal system operation.
- If Alarm occurs, compressor stops.
- System operation stops when ALARM light is activated / blinking longer than 3 minutes.

7. CURRENT TEMP

- Room cool mode displays current room temperature in display in Fahrenheit.
- SPOT / COOL Mode displays outlet (cool air) temperature during normal operations.
- In order to change °F to °C, press SPOT / COOL and ROOM / COOL buttons together for 2 seconds.
- C will blink 2 times and the figure will change to °C
- ALARM codes blink and are displayed when abnormal operation occurs.

8. TARGET TEMP

• Displays the unit set temperature for ROOM COOL mode only.

NOTE:The room temperature display range is from 14 °F to 122 °F. (When displayed in "°C" the range is from -10 °C to 50 °C)

Program Setting



Indication	Description	the range of setting
dĿ	Delay time setting of COMP operation. EX)If setting is 3mins, it takes 3mins to be ON after COMP is OFF.	1-5minutes, control is available per 1 minute
dF	Deviation temp setting. Ex)It operates between $86^{\circ}F(30^{\circ}C)$ to $86^{\circ}F(93.2^{\circ}C)$ (±35.6°F(±2°C)), if dF setting is 35.6°F(2°C) under 89.6°F(32°C)(temp setting).	33.8°F ~ 41°F (1℃~ 5℃)
51	Temperature Correction	-50°F ∼ 50°F (-10°C ∼ +10°C)
52	Temperature Correction	-50°F ∼ 50°F (-10℃ ~ +10℃)
53	IC temperature setting (Frost prevention sensor)	-41°F ~41°F (-5°C ~+5°C)

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Relay Board

The relay board contains the compressor and fan on relays, in addition to a stepdown transformer that converts the line voltage (WPC-15000S: 208/230 VAC) to 12V. This voltage is then converted from AC to DC and used for relay coil activation. The 12 V (DC) power is sent to the control panel assembly.

- 1) Power supply requirements WPC-15000S requires a single-phase 208/230 V, 60 Hz power supply.
- Relay board fuse

The relay board fuse is the only serviceable component on the relay board assembly. This fuse provides protection against damage to the step-down transformer. The fuse must be replaced with the exact same part, or a suitable equivalent.

Specifications : 3.15 A 250 VAC



CAUTION Failure to use the exact same fuse may result in damage to the unit and/or components, and will also void the unit warranty.

3) Input Signal

The relay board receives inputs from the control panel, sensors, and external devices to perform device control.

Control Panel Input

Symbol	Indication	Function	Connector
	ON/OFF Button	If POWER BUTTON is pressed during operation, unit stops.	
	FAN Button	Changes fan speed from LOW to HIGH when pressed.	CONS
	SET TEMP A Button	Regulates temperature based on outlet cool air temperature.	CONS
	SET TEMP ⊽ Button	Regulates temperature based on inlet ambient air temperature.	

Sensor Input

Cumhal	Trues	Specification		Compostory		
Symbol	туре	Characteristic	"Short" Detection	"Open"Detection	Connector	
TH1	OUT TEMP SENSOR	10 k ohm at 77 °F (25 °C)	181 °F (83 °C) or more	-29 °F (-34 °C) or less	TH1	
TH2	IN TEMP SEN- SOR	10 k ohm at 77 °F (25 °C)	181 °F (83 °C) or more	-29 °F (-34 °C) or less	TH2	
тнз	ICE TEMP SEN- SOR	10 k ohm at 77 °F (25 °C)	181 °F (83 °C) or more	-29 °F (-34 °C) or less	TH3	

External Input Signal Specification

Symbol	Signal	Specification	Function	Connector
со	Comp Overload	On: Between 10 to 20 mA at DC12 V (Off: No signal)	On: Activates "Defect control" (Contact: Normally open) LED shows "CO", Output signal"ON"	СО
FD	External Pump Failure	On: Between 10 to 20 mA at DC12 V (Off: signal)	Off: Activates "Defect control" (Contact: Normally open) LED shows "FU", Output signal"ON"	FD
НР	Pressure Switch	On: Between 10 to 20 mA at DC12 V (Off: signal)	On: Activates "Defect control" (Contact: Normally closed) LED shows "PS" output signal "ON"	HP
FT	Tank Full Switch	On: Between 10 to 20 mA at DC12 V (Off: signal)	On: Activates "Defect control" (Contact: Normally closed) LED shows "FT", Output signal"ON"	FT

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Control Specifications

- 1) EVAPORATOR FAN MOTOR
- When the BLOWER button is pressed, the RL1/3 (fan motor HI/LOW) relay on the relay board turns on, operating the fan.

Specifications:

- RL1/3 (Fan motor HI-LOW) relay output: 10 A at AC 250 V
- 2) Compressor start control
- When the ON/OFF button is pressed, the RL4 relay on the relay board turns on, operating the compressor.

Specifications:

- RL4 (Compressor On-Off) relay output: 5 A at AC 250 V
- 3) Anti-freeze control
- Anti-freeze controls turns the compressor on and off by turning the RL4 relay on in accordance with the freeze protection thermistor (TH3) temperature. As a result, decreases in cooling performance due to frost buildup on the evaporator are prevented.
- Compressor off conditions: Freeze protection thermistor (TH3) temperature ≤ 28.4 °F (-2 °C)
- Compressor on (recovery) conditions: TH3 (ICE temperature) ≥ 33.8 °F (1 °C)



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4) Compressor time delay control (compressor protection)

Compressor protection consists of a time delay program within the microprocessor. This program prevents a heavy load from being applied to the compressor motor when restarting the unit (room/cool mode or spot/cool mode) after a very short period of time. This "delay" is in effect any time the compressor is turned on by either the POWER ON/OFF button or ROOM/COOL or SPOT/COOL ON/OFF button.

Specifications:

- Time Delay: 120 sec.
- 5) Automatic restart and recovery function
- The microprocessor contains a feature that automatically restart the unit after power is lost and regained, and also has memory to store and recover operation status in the even of a power loss.

Status of memory during power interruption

- When the input power is off, the status items below are saved in the memory.
 - Running status (on or off)
 - Operating mode: Cool mode or fan only mode
 - Set temperature
 - Temperature mode (°F or °C)

6) Temperature control

 During cool mode, temperature control changes the RL4 (compressor on/off) relay status according to TH3 temperature in the available range(-4 °F to 140 °F (-20 °C to 60 °C)).



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Self-Diagnostic Codes

Self-diagnostic codes are displayed on the Display Panel under the following conditions.

SELF-DIAGNOSTIC ALARM CODES				
Alarn	n Code	Possible Causes	What To Do	
	Compressor overload	 High ambient temperature Unstable power supply Defective compressor 	 Ambient temperature must be under 113°F(45°C) Check the power supply Contact a qualified service agent 	
<mark>ب</mark> ب	Out of phase	Incorrect power cable connection	Re-connect the power cable to the correct power source	
투급	Drain pump (Applicapable for unit with drain pump)	 Defective drain pump Improper water circulation 	 Check the hose connection from drain pump Replace the drain pump Contact a qualified service agent 	
	High pressure	 Improper air circulation High ambient temperature 	 Clean the air filter Ensure exhaust duct is not blocked or kinked Ambient temperature must be under 113°F(45°C) 	
	Low Pressure	 Refrigerant leak Low ambient temperature 	 Contact a qualified service agent 	

Table 1- Alarm Codes

SELF-DIAGNOSTIC ALARM CODES					
Alarn	n Code	Possible Causes	What To Do		
	Frost on heat exchanger	Indoor heat exchanger temperature too low	 Do not use the air conditioner if ambient temperature is lower than 64°F(18°C) Contact a qualified service agent 		
	Abnormal temperature sensor value	TH1(Evaporator coil) temperature sen- sor has a loose or broken connection	Contact a qualified service agent		
	Abnormal temperature sensor value	TH2(Evaporator coil) temperature sen- sor has a loose or broken connection	Contact a qualified service agent		
	Abnormal temperature sensor value	TH3(Evaporator coil) temperature sen- sor has a loose or broken connection	Contact a qualified service agent		

Table 1- Alarm Codes

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Compressor

- 1) Compressor motor
- The compressor motor is a single-phase motor and is contained within the same housing as the compressor.

Specifications:

	Rated Voltage	CAPACITY
WPC-15000S	220 V	20,456W ±5%



- 2) Compressor overload relay
- The compressor overload relay is used to protect the compressor motor. The relay interrupts the flow of current when there is an overload condition and, high temperature builds up in the compressor.



Fan Motor

- The fan motor is a single phase, induction type. The motor rotates the fan on both the evaporator side and the condenser side at the same time.
- The following table shows the specifications of the fan motor used for each model.

NOTE:An internal overload relay is used to protect the fan motor. This relay is built into the fan motor and interrupts the flow of current when there is an over current situation, or if abnormally high temperature builds up in the fan motor.

Capacitor

• The capacitor is used to improve the rotational power of the fan motor and compressor at start up. The specification for each capacitor is shown below.

	Capacitor	Rated Voltage	Capacitance
WPC-15000S	Compressor	450 V	70µF
	Cond Motor	450 V	25µF
	Eva Motor	450 V	10µF







Temperature Sensor

- Outlet temp sensor (TH1) is installed on top of the evaporator, and detects evaporator outlet temperature as a resistance value.
- Inlet temp sensor (TH2) is installed in front of evaporator, and detects evaporator inlet temperature as a resistance value.



• Ice temp sensor (TH3) is installed in the evaporator outlet piping, and detects low temperature on the evaporator as a resistance value.

Sumbol	Turne		Connector			
Symbol	туре	Characteristic	"Short"Detection	"Open"Detection	Connector	
TH1	OUT TEMP SENSOR	10 k ohm at 77 °F (25 °C)	181 °F (83 °C) or more	-29 °F (-34 °C) or less	TH1	
TH2	IN TEMP SENSOR	10 k ohm at 77 °F (25 °C)	181 °F (83 °C) or more	-29 °F (-34 °C) or less	TH2	
TH3	ICE TEMP SENSOR	10 k ohm at 77 °F (25 °C)	181 °F (83 °C) or more	-29 °F (-34 °C) or less	TH3	

Drain Pump

- Drain pump is the device that drain the condensate automatically, when the water level caused by heat exchanging is rising up.
- Check the drain pump defective or improper hose connection, when the alarm code is "Fd"
- Turn off the power when you reassemble it.

Model : MD-1000C

Power Supply	Amps	Weight	The capacity of the water tank	Duct Diameter
60Hz 220∨	0.99A	3.13 kg	3.2ℓ	3/8"

Amount of dehumidification (Liter/Time@Height)			Maximum Pu	umping Head
0 m	5 m	10 m	Meter	Ft
648 l/h	366 l/h	204 l/h	10.0m	33

mm(inch)





ASSEMBLY







TOP FAN EXHAUST FLANGE

- 1. Remove the top fan exhaust flange from carton.
- 2. Place the top fan exhaust flange on the top of air conditioner.
- Use screws (enclosed inside of box with the top fan exhaust flange) to install the top fan exhaust flange on air conditioner as shown in Figure 6.

HANDLE

- 1. Remove a handle from carton.
- 2. Place the handle on upper side of rear panel.
- 3. Use screws (enclosed inside of box with a handle) to install the handle as shown in Figure 7.

Please read this manual carefully for instructions on correct installation and usage. Please read all safeguards.

- 1. Transport and store the unit in an upright position only. Leave unit in an upright position for at least 3 hours before first use.
- 2. Always place the unit on an even, level surface.
- 3. Ensure the unit is connected to a grounded power supply of the correct rating / capacity.
- 4. The unit will cool when the room temperature is between 18°C (64.4°F) ~ 45°C(113°F) depending on the thermostat setting.
- 5. DO NOT use this unit for functions other than those described in this instruction manual.
- 6. DO NOT tilt the unit.
- 7. DO NOT cover or obstruct the unit's inlet and outlet grilles.
- 8. DO NOT use the unit in areas where it will be exposed to rain or water.
- 9. NEVER unplug the unit while it is operating.



WARNING DO NOT use the unit in wet environments, such as a laundry room, to avoid the risk of electrical shock.

- 10. DO NOT place any foreign objects on the unit.
- 11. DO NOT operate the unit with wet or damp hands.
- 12. DO NOT allow chemical substances to come into contact with the unit.
- 13. DO NOT operate the unit in the presence of flammable substances or vapors such as alcohols, pesticides, gasoline, etc.



WARNING DO NOT operate the unit in explosive or flammable environments.

- 14. DO NOT use the plug to start and to stop the unit. Always use the control panel to start and to stop the unit.
- 15. Always turn off the unit when it is not in use and unplug the power plug from the electrical outlet.
- 16. Always turn the unit off and unplug the main power plug from the electrical outlet before cleaning, moving or performing maintenance.

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- 17. AVOID the use of adapter plugs or extension cords. If it is necessary to use an extension cord or an adapter plug to operate the unit, ensure that they are correctly rated for the application. Consult a local qualified electrician and all local electrical codes to ensure proper setup. Any extension cord used with this device must be rated for a minimum of 15A.
- 18. DO NOT unplug the unit by pulling on the electrical cord. Keep electrical cord away from heat sources and always completely unroll the cord to avoid overheating. If the power cord becomes damaged, a qualified service agent, qualified electrician, or similarly qualified person must replace it, in order to avoid a hazard or shock.

WARNING DO NOT operate a unit with a damaged power cord.

- 19. The filters must be used with the product at all times. When the filters are removed for cleaning, always ensure that the unit has been turned off and unplugged from the electrical outlet.
- 20. Regularly clean the filters to maintain efficiency. If the filters are not cleaned regularly, the units output performance and efficiency will decline and energy consumption will increase.
- 21. DO NOT operate the unit with a damaged power cord or plug, after it malfunctions, has been dropped or damaged.
- 22. Only use in the upright position on an even, flat surface. Unit must be positioned at least 24 inches (60 cm) from the nearest object in any direction.
- 23. Stop operation immediately if abnormal noise or odor is noticed. Contact a local service center.
- 24. Appliance is not to used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- 25. Children being supervised not to play with appliance.
- 26. That the appliance shall be installed in accordance with national wiring regulations.
- 27. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

SAVE THESE INSTRUCTIONS

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Troubleshooting chart

Symptom	Possible Cause(s)	Corrective Action	
	Position issue / Damage	1. Check the water tank is placed on the correct position Replace the damaged water tank with the new one.	
Water leakage		 Remove any object stuck underneath the Drain Pan underneath the water tank 	
	Drain pump issue	1. Remove blockage from	
		drain hose 2. Replace the defective drain	
		pump with the new one.	
	Check the power sup- ply to verify that power is available to the unit	1. Reset the circuit breaker and restart the unit	
The unit doesn't work	Verify that the power cord is connected	1. Connect power cord	
	Trip off the circuit breaker	1. Electrical access panel in Reset the circuit breaker and restart the unit (Consult a local qualified electri- cian)	
No cold air flows from the cold air outlet	Ambient air cannot be properly cooled if the filter is dirty and not regularly cleaned	1. Clean the filter	

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Symptom	Possible Cause(s)	Corrective Action
	Compressor will not work if the unit is turned off and on quickly.	 Wait 3 minutes after unit is turned off before turning the unit back on.
		2. Check the Cool Icon If the light is off, A/C will be activated after light is on.
No cold air flows from the cold air outlet	Refrigerant leaking	1. Charge the refrigerant
	The ambient air temperature may be too high	 The temperature of the compressor can be higher when the ambient tem- perature is too high. The compressor will not work unless the ambient air temperature is within the acceptable operating range of the unit
Water flow can be heard after compressor shuts off	No cause	Common to hear coolant flow- ing after unit shuts off

* A defective unit must be repaired by a qualified company.



DISASSEMBLY Disassembly



- 1) Remove the after turning off the circuit breaker (For Safety)
- 2) Take out the twelve (2) screws, and remove front panel.
- 3) Take out the twelve (12) screws, and then remove the cooling air duct.



4) Take out the four(4) screws, and then remove the brake box cover.





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6) Take out the nine (13) screws, and then remove the back cover.

Screws (4) Cover Top Front Screws (11) Screws (11)



- 7) Take out the nine (15) screws, and then remove the cover top Rear.
- 8) Take out the nine (11) screws, and then remove the cover top front.
- 9) Cover top front the control panel and then remove the front panel.

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- 11) Remove the air filter from the back panel.Take out the thirteen (12) screws, and then remove the LF Cover rear.
- 12) Take out the seven (10) screws, and then remove the RH Cover front.



- 13) Remove the air filter from the back panel.Take out the thirteen (10) screws, and then remove the LF Cover Front.
- 14) Take out the seven (11) screws, and then remove the RH Cover Front.

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Control Panel Removal



1) Take out the four (4) screws, and then remove the control panel.

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Electrical parts and relay board removal (WPC-15000S)





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Fan Motor Removal (Model : WPC-15000S)

- 1) Take off the three (4) nuts , and then remove the condenser Duct.
- 2) Take off the three (6) bolts , and then remove the condenser motor BKT RH.
- 3) Take out the four (6) bolts, and then remove the condenser motor fan.
- 4) Take off the three (4) nuts , and then remove the evaporator Duct.
- 5) Take off the three (6) bolts , and then remove the evaporator motor BKT RH.
- 6) Take out the four (6) bolts, and then remove the evaporator motor fan.

REFRIGERANT SYSTEM REPAIR

Brazing

- In the event of a leak, obstruction, or trouble in the refrigerant system of the unit, replace or repair the defective component. After replacing defective component, braze all connections.
- 1) Proper brazing techniques
- When brazing, use a slightly reduced flame. Oxyacetylene is commonly used since the flame condition can be easily judged and adjusted. Unlike gas welding, a secondary flame is used for brazing. Properly preheat the base metal according to the shape, size and thermal conductivity of the brazed fitting.
- The most important point in flame brazing is to bring the entire brazed fitting to a proper brazing temperature. Care should be taken not to cause overflow of the brazing filler metal, oxidation of the brazing filler metal, or filler metal deterioration due to overheating the flux.
- 2) Brazed fittings and fitting clearance
- In general, the strength of the brazing filler metal is lower than that of the base

metal. As such, the shape and clearance of brazed fittings are very important. Concerning the shape of brazed fittings, adhesive area must be maximized. In addition, the clearance of the brazed fitting must be minimized so that the brazing filler metal will flow into the fitting via capillary action.





- 3) Cleaning brazing filler metal and piping
- When the refrigerant system has been opened, exposure to heat may cause the brazing filler metal to stick to the inside and outside of the piping. Brazing filler metal may also combine with oxygen in the air to form an oxide film. In addition, grease and oils may stick to the pipe during handling. All these factors will reduce the effectiveness of brazing. Therefore, excess brazing filler metal must be removed with sand paper, and by thorough cleaning with a solvent such as Trichlene.
- 4) Dry Nitrogen gas use
- During brazing, the inside of the pipe undergoes an oxidative reaction due to the brazing flame. Introduce dry nitrogen gas (0.3 gal/min (1 L/min); adjust with the flow regulator) through the pinch-off tube of the refrigerant cycle to prevent oxidation.

NOTE: Do not get foreign matter such as dirt, water, or oil into the piping.

5) Vertical joints

- For vertical joints, heat the entire brazed fitting to the proper brazing temperature. Bring the brazing filler metal into contact with the fitting so that the brazing filler metal begins to flow.
- Stop heating the fitting as soon as the brazing filler metal has flown into the gap (clearance). Since the brazing filler metal flows easily into portions heated to the proper temperature, the entire fitting must be kept at the proper brazing temperature.



Service Manual

Charging the System with R-410A Refrigerant

- Always ensure that the refrigerant system has been properly evacuated before charging with the specified amount of R-410A.
- Equipments is only for R-410A.
- Liquid charge (no gas charge).
- Make sure not to use more than 90 % of the initial weight of R-410A in the cylinder.

WARNING

- •When handling refrigerant (R-410A), the following precautions should always be observed:
- Always wear proper eye protection while handling refrigerant.
- Maintain the temperature of the refrigerant container below 104 $^\circ F$ (40 $^\circ C).$
- Perform repairs in a properly ventilated area. (Never in an enclosed environment.)
- Do not expose refrigerant to an open flame.
- Never smoke while performing repairs, especially when handling refrigerant.
- Be careful the liquid refrigerant does not come in contact with the skin.
- If liquid refrigerant strikes eye or skin:
- Do not rub the eye or the skin.
- Splash large quantities of cool water on the eye or the skin.
- Apply clean petroleum jelly to the skin.
- Go immediately to a physician or to a hospital for professional treatment

Connection of gauge manifold

- 1) Properly remove the crushed end of the pinch-off tube at the high pressure side and the low pressure side of the refrigerant cycle with a pipe cutter.
- 2) Fit the process tube fitting to the pinch-off tube on both sides.
- Connect the charging hoses (low pressure side) for the gauge manifold to the tube fitting.
- **NOTE:** Connect the hoses using care not to mistake the high pressure side for the low pressure side and vice versa.
- 4) Connect the charging hose at the center of the gauge manifold to the vacuum pump.



Refrigerant

Cycle Side

Evacuation

- 1) Open the low pressure valve (LOW) of the gauge manifold.
- Turn on the vacuum pump to start evacuation.(Evacuate the system for approximately 30 min.)
- When the low pressure gauge indicates 30 inHg(100 kPa), turn off the vacuum pump and close the Low pressure valves of the gauge manifold.

4) Leave the high pressure valve and the lowpressure valve of the gauge manifold closed

for five min or more, and confirm that the gauge pointer does not return to zero.



(when stopped)



Charging Hose Side **Refrigerant Charging Work**

(1)Refrigerant charging

- 1) Remove the charging hose from the vacuum pump, and connect it to the refrigerant cylinder (R-410A).
- 2) Loosen the nut on the gauge manifold side of the charging hose. Open the valve of the charging hose. Open the valve of the refrigerant cylinder. After air purging, tighten this nut and close the valve of the refrigerant cylinder.
- 3) Securely place the refrigerant cylinder on a scale with a weighing capacity of 70 lb (30 kg) that is graduated by 0.2 oz (5 g).



4) Open low the high pressure valve of the gauge manifold and the valve of the refrigerant cylinder. Charge the system with refrigerant to the specified amount. Standard Amount of Refrigerant:

- WPC-15000S : 98.8 oz (2,800 g)



The amount of refrigerant charged has a great effect on the cooling capacity of the unit. Charge to the specified amount, always observing the scale graduations while charging.

5) Close the high pressure valve of the gauge manifold and the valve of the refrigerant cylinder.

(2)Removal of gauge manifold

- 1) Crimp the pinch-off tube with a pinch-off tool.
- Remove the gauge manifold and the process tube fitting. Crush the end of the pinch-off tube.
- 3) Braze the end of the pinch-off tube.
- 4) Ensure that a gas leak is not present at the pinched off portion and the brazed end.





🔔 WARNING

• Do not attempt any repair on a charged system.

\Lambda WARNING

•Before checking for gas leaks, fully confirm that there is nothing flammable in the area to cause an explosion or fire. Contact of refrigerant with an open fire generates toxic gas.



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