Packaged Terminal Air Conditioner

Service Manual

Ⅰ. Summary and Features

Summary:

The unit is the packaged one, including the indoor part and the outdoor part. The unit is installed in the hole pre-embedded in the wall, which is different from traditional installation and prettifies the room, without occupying the space.

Features:

a. Easy installation: Install the drainage pipe at first, and then push the unit into the installed cabinet assy. At last, turn the safety clamp for 90 degrees to finish.
b. Easy cleaning and maintenances: Pull the unit out and unscrew the 6 screws used for fixing the cover plate to remove it. In this case, condenser can be cleaned with water. At last, lift the unit slightly to drain the water.
c. High energy efficiencies: the unit meet for the latest DOE requirement and the AHRI standard.
d. Silent design: optimized air discharge channel design, specialized blower wheel, the lower rotational speed, contributing better noise control.

Ⅱ Specification and Technical Parameter

Cooling only unit (208-230V)

Model			CPS-07CNR1-F	CPS-09CNR1-F	CPS-12CNR1-F	CPS-15CNR1-F
Power supply			208~230V/1PH/60Hz			
Cooling	capacity	Btu/h	7400/7200	9300/9500	11800/12000	14700/14500
	Power Input	W	620/605	835/815	1140/1120	1470/1450
	EER	Btu/w	11.9/11.9	11.4/11.4	10.7/10.7	10.0/10.0
Indoor side performance	Air flow	CFM	424/365	424/365	441/382	470/412
	Noise level	dB(A)	49/41	49/40	53/47	52/49
Net dimension	W×H×D	mm	1066×535×408	1066×535×408	1066×535×408	1066×535×408
		inch	42*21*16	42*21*16	42*21*16	42*21*16
Packing dimension	W×H×D	mm	1150×630×480	1150×630×480	1150×630×480	1150×630×480
		Inch	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9
Net Weight		kg	42	42	45.5	48.5
		lbs	92.6	92.6	100.3	106.9
Gross Weight		kg	47	47	50.5	53.5
		lbs	103.6	103.6	111.3	117.9
Charged refrigerant weight		g	570	550	750	970
		ozs	19.28	18.60	25.36	32.80
Qty'per20'/40'/40HQ		Set	72/152/190	72/152/190	72/152/190	72/152/190

Cooling with electric heater unit (208-230V)

Model			CPS-07ENR1-F	CPS-09ENR1-F	CPS-12ENR1-F	CPS-15ENR1-F
Power supply			208/230V/1PH/60Hz			
Cooling	Capacity	Btu/h	7400/7200	9500/9300	12200/12000	14700/14500
	Power Input	W	620/605	835/815	1140/1120	1470/1450
	EER	Btu/w	11.9/11.9	11.4/11.4	10.7/10.7	10.0/10.0
Electric heater		Btu/h	10200/8300	10200/8300	10200/8300	17000/13900
		W	3000/2450	3000/2450	3000/2450	5000/4085
Indoor side performance	Air flow	CFM	424/365	412/365	441/382	470/412
	Noise level	dB(A)	49/41	49/40	53/47	52/49
	Electric heater	KW	2/2.5/3/3.6	2/2.5/3/3.6	2/2.5/3/3.6/5	2/2.5/3/3.6/5
Net dimension	W×H×D	mm	1066×535×408	1066×535×408	1066×535×408	1066×535×408
		inch	42*21*16	42*21*16	42*21*16	42*21*16
Packing dimension	W×H×D	mm	1150×630×480	1150×630×480	1150×630×480	1150×630×480
		inch	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9

Net Weight		kg	42.5	42.5	46	49
		lbs	93.7	93.7	101.4	108.0
Gross Weight		kg	47.5	47.5	51	54
		lbs	104.7	104.7	112.4	119.0
Refrigerant	weight	g	570	550	750	970
		ozs	19.28	18.60	25.36	32.80
Qty'per20'/40'/40HQ		Set	72/152/190	72/152/190	72/152/190	72/152/190

Heat pump with electric heater unit(208-230V)

Model			CPS-07ANR1-F	CPS-09ANR1-F	CPS-12ANR1-F	CPS-15ANR1-F
Power supply			208/230V/1PH/60Hz			
Cooling	Capacity	Btu/h	7200/6800	9200/9000	12000/11800	14700/14500
	Power Input	W	605/570	805/790	1130/1110	1470/1450
	EER	Btu/w	11.9/11.9	11.4/11.4	10.6/10.6	10.0/10.0
Electric heater		Btu/h	10200/8300	10200/8300	10200/8300	17000/13900
		W	3000/2450	3000/2450	3000/2450	5000/4085
Heating	Capacity	Btu/h	6000/5800	8300/8100	10800/10500	13600/13400
	Power Input	W	520/500	715/700	960/930	1245/1225
	COP	W/W	3. 4/3.4	3.4/3.4	3.3/3.3	3.2/3.2
Indoor side performance	Air flow	CFM	424/365	412/365	424/365	470/412
	Noise level	dB(A)	49/41	49/40	49/41	52/49
	Electric heater	KW	2/2.5/3/3.6	2/2.5/3/3.6	2/2.5/3/3.6/5	2/2.5/3/3.6/5
Net dimension	W×H×D	mm	1066×535×408	1066×535×408	1066×535×408	1066×535×408
		inch	42*21*16	42*21*16	42*21*16	42*21*16
Packing dimension	W×H×D	mm	1150×630×480	1150×630×480	1150×630×480	1150×630×480
		inch	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9
Net Weight		kg	43	43	46.5	49.5
		lbs	94.8	94.8	102.5	109.1
Gross Weight		kg	48	48	51.5	54.5
		lbs	105.8	105.8	113.5	120.1
Refrigerant	weight	g	570	600	750	970
		ozs	19.28	20.29	25.36	32.80
Qty'per20'/40'/40HQ		Set	72/152/190	72/152/190	72/152/190	72/152/190

Cooling with electric heater unit (265V)

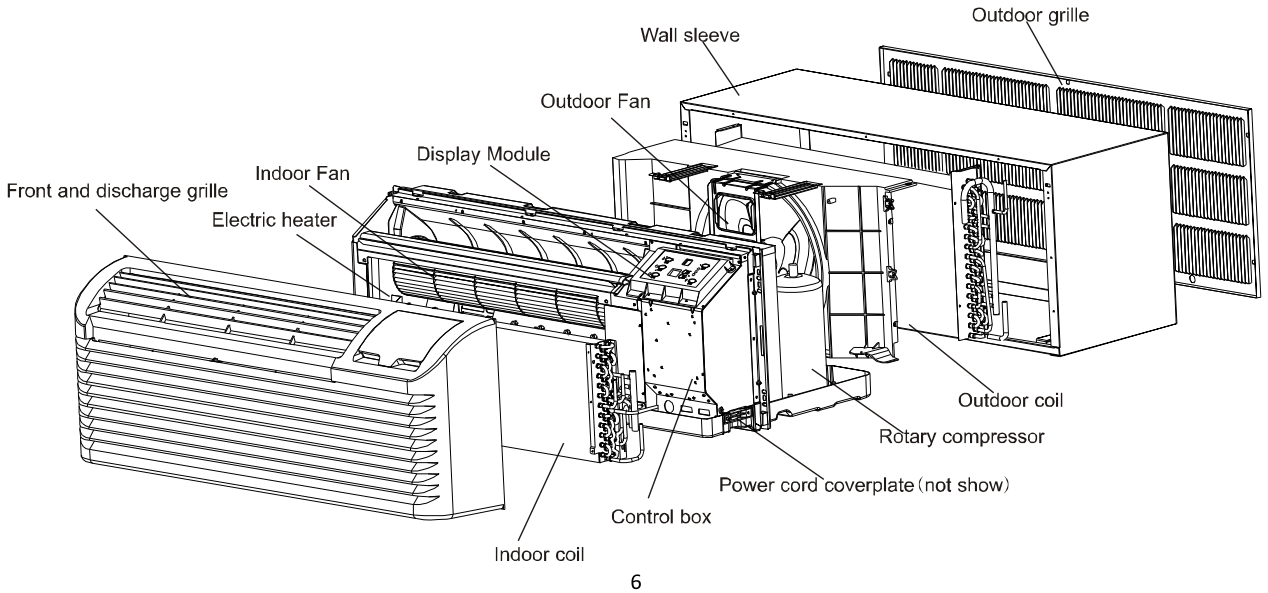
Model			CPS-07EFR1-F	CPS-09EFR1-F	CPS-12EFR1-F	CPS-15EFR1-F
Power supply			265V/1PH/60Hz			
Cooling	Capacity	Btu/h	7000	9200	12000	15000
	Power Input	W	595	805	1145	1485
	EER	Btu/w	11.9	11.4	10.5	10.1
Electric heater		Btu/h	10200	10200	10200	17000
		W	3000	3000	300	5000
Indoor side performance	Air flow	CFM	388/265	388/265	400/312	400/312
	Noise level	dB(A)	49/44	52/44	52/47	53/47
Net dimension	W×H×D	mm	1066×535×408	1066×535×408	1066×535×408	1066×535×408
		inch	42*21*16	42*21*16	42*21*16	42*21*16
Packing dimension	W×H×D	mm	1150×630×480	1150×630×480	1150×630×480	1150×630×480
		inch	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9
Net Weight		kg	42.5	46	46.5	52.5
		lbs	93.7	101.4	102.5	115.7
Gross Weight		kg	47.5	51	51.5	57.5
		lbs	104.7	112.4	113.5	126.8
Refrigerant	weight	ml	525	560	665	950
		ozs	17.75	18.94	22.49	32.13
Qty'per20'/40'/40HQ		Set	72/152/190	72/152/190	72/152/190	72/152/190

Heat pump with electric heater unit (265V)

Model			CPS-07AFR1-F	CPS-09AFR1-F	CPS-12AFR1-F	CPS-15AFR1-F
Power supply			265V/1PH/60Hz			
Cooling	Capacity	Btu/h	7000	9200	12000	15000
	Power Input	W	590	805	1140	1485
	EER	Btu/w	11.9	11.5	10.5	10.1
Electric heater		Btu/h	10200	10200	10200	17000
		W	3000	3000	3000	5000
Heating	Capacity	Btu/h	6100	8100	11000	14000
	Power Input	W	525	705	1005	1325
	COP	W/W	3. 4	3.4	3.2	3.1
Indoor side	Air flow	CFM	388/265	388/265	400/312	400/312

performance	Noise level	dB(A)	49/44	52/44	52/47	53/47
Net dimension	W×H×D	mm	1066×535×408	1066×535×408	1066×535×408	1066×535×408
		inch	42*21*16	42*21*16	42*21*16	42*21*16
Packing dimension	W×H×D	mm	1150×630×480	1150×630×480	1150×630×480	1150×630×480
		inch	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9	45.3*24.8*19.9
Net Weight		kg	43	45.5	47	52.5
		lbs	94.8	100.3	103.6	115.7
Gross Weight		kg	48	50.5	52	57.5
		lbs	105.8	111.3	114.6	126.8
Refrigerant	weight	g	525	50.5	665	950
		ozs	17.75	18.94	22.49	32.13
Qty'per20'/40'/40HQ		Set	72/152/190	72/152/190	72/152/190	72/152/190

Ⅲ Parts' Name



Wall sleeve: all our sleeves have industry standard dimensions of 42'' wide x 16'' high. The 14'' depth is the industry standard. Sleeves may be shipped separately to allow for installation during construction.

Outdoor grill: available in stamped aluminum louvered for application with wall sleeve.

Condensate drain kit: attaches to the wall sleeve base pan for controlled internal or external disposal of condensate.

Ⅳ Controller Function Manual and Operating Method

Controller Function Manual

This function manual is applicable to PTAC. The unit for temperature is centigrade. If there's Fahrenheit, their transition relations is T Fahrenheit =T centigrade *1.8+3.2.

1. Temperature Parameter
   - Indoor setting temperature (T_{peset})
   - Indoor ambient temperature (T_{amb})
2. System Basic Function

   In any circumstances, the compressor will delay 3 mins 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 3mins 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 Tamb≥Tpreset+2℉(1℃), the unit is running in cooling mode. Meanwhile, the compressor is running

and the fan is running at the setting fan speed;

When Tamb≦Tpreset-2℉(1℃), the unit is turn to OFF status. Meanwhile, the compressor will stop, while the fan will run at the setting fan speed for 15s delay;

When Tpreset-2℉(1℃)<Tamb<Tpreset+2℉(1℃), the unit keeps previous running status.

◇In this mode, the dual 8 nixie tube displays the setting temperature and the cooling LED is bright. The setting temperature range is 60~90℉(16~32℃).

2) Fan Mode

In this mode, the compressor won't run and the temperature can't be adjusted (UP and DOWN are invalid). The fan can select high, medium and low fan speed to run. The dual 8 nixie tube displays ambient temperature(32~99℉, when ambient temperature is higher than 99℉, it will display 99; when ambient temperature is lower than 32 ℉, it will display 32), and the fan LED is bright.

3) Auto Mode

Working conditions and process is auto adjusted by the indoor ambient temperature.

When Tamb＞78℉(26℃), the unit is running in cooling mode. Meanwhile, the compressor is running and the fan is running at the setting fan speed.

When Tamb＜70℉(21℃), the unit is running in heating mode; If 70℉(21℃)≤Tamb≤78℉(26℃), the unit is running in fan mode.

If the unit is cooling only unit, it will run in fan mode when Tamb≤78℉(26℃).

4) Heating Mode

Working condition and process for heating:

When T_{amb}≤Tpreset-2℉(1℃), the unit is running in heating mode. Meanwhile, the compressor is running and the fan is running at the setting fan speed;

When T_{amb}≥Tpreset+2℉(1℃), the unit is turn to OFF status. Meanwhile, the compressor will stop, while the fan will run at the setting fan speed for 15s delay;

When Tpreset-2℉(1℃)<T_{amb}<Tpreset+2℉(1℃), the unit keeps previous running status.

Electric-heater can't work with compressor at the same time. When T_{amb}＜44℉(7℃)，unit will run with Electric-heater, when T_{amb}≥44℉(7℃)，unit will run with compressor.

5) Low Temperature Resistant Protection

This is valid in standby cooling and fan mode.

Entry condition: If dial-up chooses the low temperature resistant protection and it's detected that the indoor ambient temperature is lower than 50℉(10℃) for 3mins successively .

Quitting condition: When the indoor ambient temperature is raising more than 55 ℉(13℃), the low temperature resistant protection will be stopped

After entering into the low temperature resistant protection, it can't be quitted by pressing any buttons ;(except the heating mode) Others: In the low temperature resistant protection, the dual 8 displays "L0'".

6) Open circuit and short circuit of temperature sensor

If the temperature sensor is open circuit or short circuit, it must send the error signal. The error signal is displayed by the displayer"dual 8"(it won't display when turning off the unit, while the malfunction LED will display it). If the malfunction of temperature sensor is detected in continuous 30s, unit will turn off.

3. Buttons and Display

1) Buttons

There are ON/OFF, UP, DOWN, HEAT,COOL, FAN and FAN SPEED seven buttons in all..

In ON status, all the buttons are in valid.

① ON/OFF: After pressing the ON/OFF button, the unit can be switched between ON and OFF.

② COOL, HEAT, FAN: In ON status, after pressing the any one of the three buttons, the unit can be running in the mode you have choice; In standby mode, after pressing the MODE button, the controller will run at

the running status.

③ FAN SPEED: In ON status, after pressing the FAN SPEED button, you can select the high, low and auto fan speed.

④ UP,DOWN: Adjust the setting temperature (60-90℉)(16~32℃) by pressing the UP and FAN SPEED buttons and you can also select other setting temperature range through configuration.

2) Dual 8 Display and LED Display

Two 8 segment nixie tube and 7 LEDs (ON/OFF, HIGH, LOW, AUTO, HEAT, COOL, FAN).

① Mode LED display: when the A/C is running in a certain kind of mode, the corresponding LED is bight.

② ON/OFF LED: In ON status, the controller is in green color.

③ Fan speed display: when the A/C is running at high, low and auto fan speed, the corresponding LED is bright.

④ Dual 8 display: In cooling and heating mode, it is default to the display the indoor ambient temperature.

⑤ Malfunction Display

After energization, STATUS LED is bright, while when there's malfunction or protection, STATUS LED will display in any circumstances. The details are as below: priority is decreasing from 1 to 8.

1	Indoor ambient temp sensor is open circuit and short circuit	Dual 8 displays "E2 "
2	Indoor tube temp sensor is open circuit and short circuit	Dual 8 displays "E3"
3	Outdoor tube temp sensor is open circuit and short circuit	Dual 8 displays "E5"
4	High pressure protection	Dual 8 displays "E9"
5	Frost protection(heat pump)	Dual 8 displays "E8"

4. Especial Functions

1) Configuration that is easy for hotel personnel to repair (8 DIP switch, the configuration is valid only after power failure)

① Heat with water

ON- heat with water; OFF- normal heating mode; default-OFF, this function is only applicable to unit with hot water coil.

② Heat pump

ON- Heat pump function is valid; OFF-other heat function

③ E-heater

ON-electric heater is valid; OFF- other heat function

④ Heat with gas

ON-gas heat is valid; OFF-other heat function

Remarks: IF A、B、C、D above are all OFF, the unit is cooling only.

⑤ Low temperature resistant is prohibited

ON- valid; OFF- invalid; default—ON

⑥ Auto-restart

ON- it's valid. OFF- it's invalid. Default-ON

⑦ FAN CYCLE/CONTINUOUS FOR HEAT

ON-fan is constantly running; OFF-fan will be stopped according to the loads (HEAT. COMP); default-OFF.

⑧ FAN CYCLE/CONTINUOUS FOR COOL

ON- fan will be stopped according to the loads (HEAT. COMP); OFF- fan is constantly running; default-OFF.

2) Configuration mode

After the unit is turned on, we could change the modes blow by pressing different buttons:

Mode one: Fahrenheit / Centigrade display mode

Fahrenheit and Centigrade display mode can be switched by pressing Set point up or Set point down button for 3s.

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

Press the Set point up button or Set point down button to display the set temperature, after finish setting, the dual 8 will flash for 5s, then display back to indoor ambient temperature.

Mode three: Display switch for different temperature set range.

Press up and Fan Speed button at the same time, dual 8 will circulatory display R1—R8, default is R8.

Mode four: exchange between 24V universal wire controller and control board.

Press the "HEAT" and "+" buttons for 5 seconds at the same time, the digital display tube will display "r" and buzzer will ring twice when it changes to 24V universal wire controller; it will display "p" and buzzer will ring once when it changes to control board.

3) Memory Function

Energizing after power failure, the controller is running according to the status before power failure.

4) Restore factory settings

Change the dipswitch 6 to OFF status, and then cut off the power supply, and then switch on the power supply, the unit will come back the default status except that temperature setting range.

5. Protection Functions

1) Indoor Coil Frost Protection in cooling mode

When compressor has run for 12 mins, and indoor coil temperature≤33℉（1℃），compressor and outdoor fan stop, and indoor fan keep running. When indoor coil temperature≥59℉（15℃）for 5 mins, or ambient temperature≤set temperature or unit OFF or mode switch, it will quit protection mode.

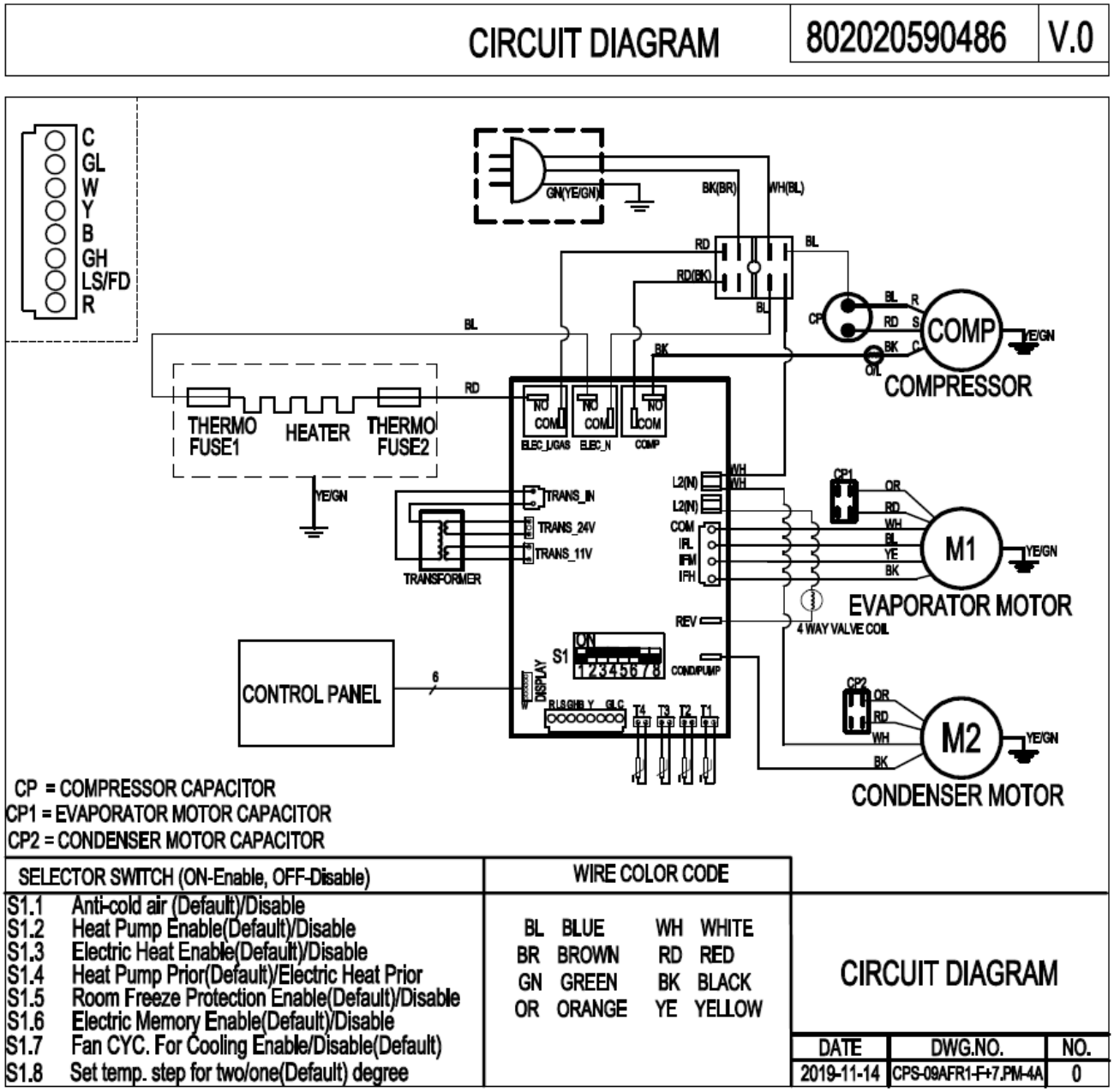
2) High pressure protection

When pressure is higher than normal condition, high pressure switch open for 3s, compressor、outdoor fan、4-way valve are in protection mode, if after 10 mins that compressor has stopped, the system comes back to normal pressure condition, units quit protection mode.

Ⅴ Electric Circuit Diagram

If the above electric circuit diagram has changed, please refer to it on the body

Remarks: LS agreement: It's a switching signal that when terminal "R" and "LS" close-break-close or break-close-break; five seconds is a cycle, if the switching signal appears once in one cycle, the unit will start. If the switching signal appears twice in one cycle, the unit will stop. If LS and R closing has lasted for about five second, the unit will be forced to stop. And this function can't be stored.



Ⅶ Malfunction Analysis

Malfunction	Reasons	Solve
Start Failure	power line bad, units don't have power supply	Check the voltage on the output side, push the RESET button, if still don't have voltage, but power grid has output, you need to change the power line.
	Power line isn't fixed well	Check that whether power line is fixed well.
	PCB/power line fuse break	exchange the PCB fuse/power line

	Bad contact between PCB and control board	Check the contact, make sure that contact well
	Compressor delay start	It's normal, compressor will start after 3 mins
	Power cut	When power on, because of auto-restart, unit will start in 120~240s
	Power line protection trip	Check the wires that whether it comes cross plate or other metal, push the RESET button on the power line.
	Unit in protection mode	Please check the code in the manuals
	PCB or Control board is bad	Replace the PCB or control board
Control board/remote control not function	Connect wire controller, control board and remote controller, unit not function	If you need to use control board and remote controller, you need to unplug the wire controller
remote controller is not sensitive	Battery has been used for a long time; control board signal receiver is not assembled well; remote controller signal is blocked.	Replace new battery; check the signal receiver is well assembled, and no things block the remote controller.
Indoor fan/outdoor fan not function or run slowly	fan is locked by something or the connection wire is not fixed well、fan capacitor is not fixed well; fan capacitor is out of service life.	Check that whether fan can running normal, whether motor wire is fixed well; for the slowly running speed, you could change a new capacitor.
Not well cooling/heating	Something is blocked at the indoor air outlet.	Make sure that there are not anything at the indoor air outlet.
	Something is blocked at the outdoor air outlet.	Make sure that the grill is suitable for the unit, wrong grill will cause the compressor being protected; make sure that the grill has more than 70% turnover
	Set not suitable temperature	Set higher/lower temperature by the control board, remark: temperature setting restriction will restrict the setting temperature.
	Indoor air return filter is blocked.	Should clean the filter every month at least.
	Room is hot/cold	Let unit run a little longer that room temperature will be lower/higher
	Heat leakage between indoor and outdoor	Block the leakage place
	Indoor coil not cold/heat	Charge the refrigerant
Unit has noise	Fan blow to plate or something in the air flue	Make sure that all the fan assembly are fixed well, and nothing is in the air flue
Bad smell when heating	The dust on the E-heater is heating	The bad smell will disappear a little later
Outlet temperature is not always cooling/heating	Outlet temperature is not high enough when heating by compressor	It's normal phenomenon, it blows comfortable air when heating.

	Fan stops when cooling/heating.	It's normal phenomenon that fan stops when get to setting temperature(In new control board, could choice the different running status by the dipswitch)
Air outlet temperature is not high enough when heating.	Air outlet temperature is not high enough.	Change to E-heater mode.
Outdoor is dripping water.	Not install the drain pipe assembly.	Install the drain pipe assembly.
Indoor is dripping water.	Wall sleeve is installed incorrectly.	Install the wall sleeve according to the installation manual.
Indoor coil freeze.	Outdoor temperature is too low.	When outdoor temperature is low to 12.8℃（55 ℉）or lower than this point, it will cause that indoor coil freeze, open the fresh air, and running at fan mode.
	Filter is blocked.	Clean the filter.
E2 Indoor temperature sensor failure	Indoor temperature sensor open circuit or short circuit	Check the sensor by multi-meter.
E3 Indoor coil temperature sensor failure.	Indoor coil temperature sensor open circuit or short circuit	Check the sensor by multi-meter.
E5 Outdoor coil temperature sensor failure.	Outdoor coil temperature sensor open circuit or short circuit	Check the sensor by multi-meter.
E8 Overheating protection/defrosting	Indoor fan failure/refrigerating system failure/indoor coil temperature sensor failure.	Check the indoor fan/refrigerating pipe/indoor coil sensor.
E9 High pressure protection.	Outdoor fan failure/refrigerating system failure/high pressure switch failure.	Check outdoor fan/refrigerating pipe system/high pressure switch.