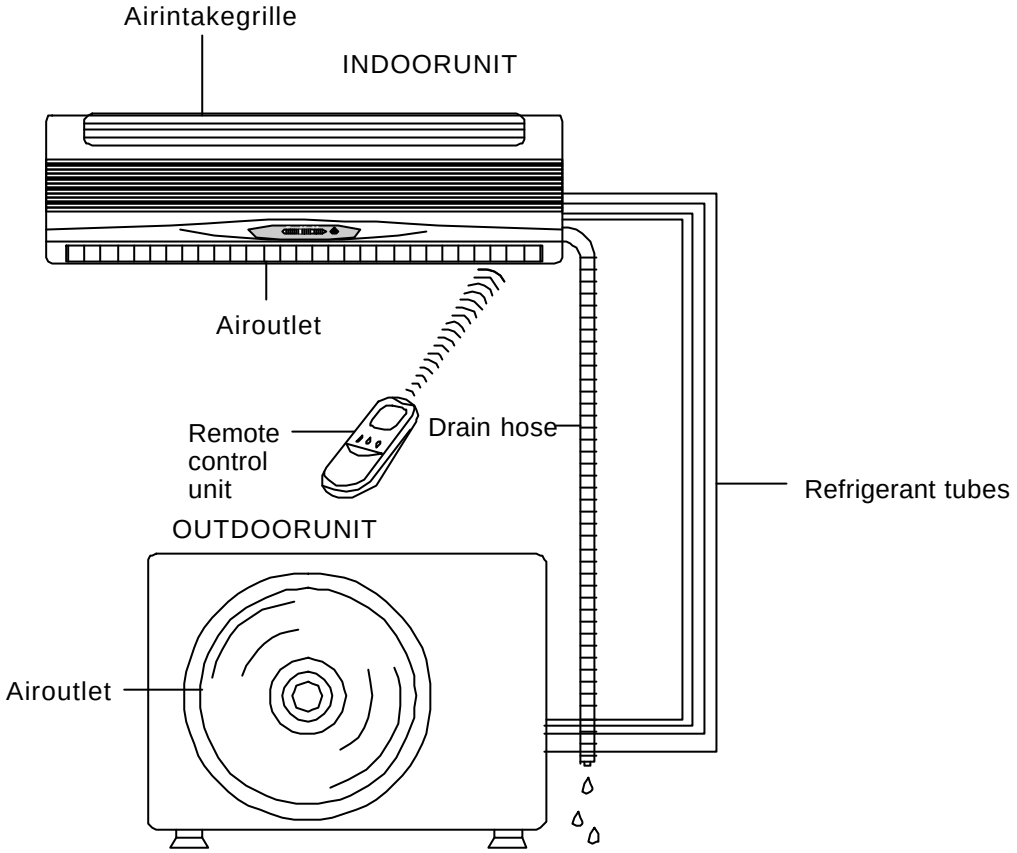
SERVICE MANUAL

KFR- 2688GW/BPE

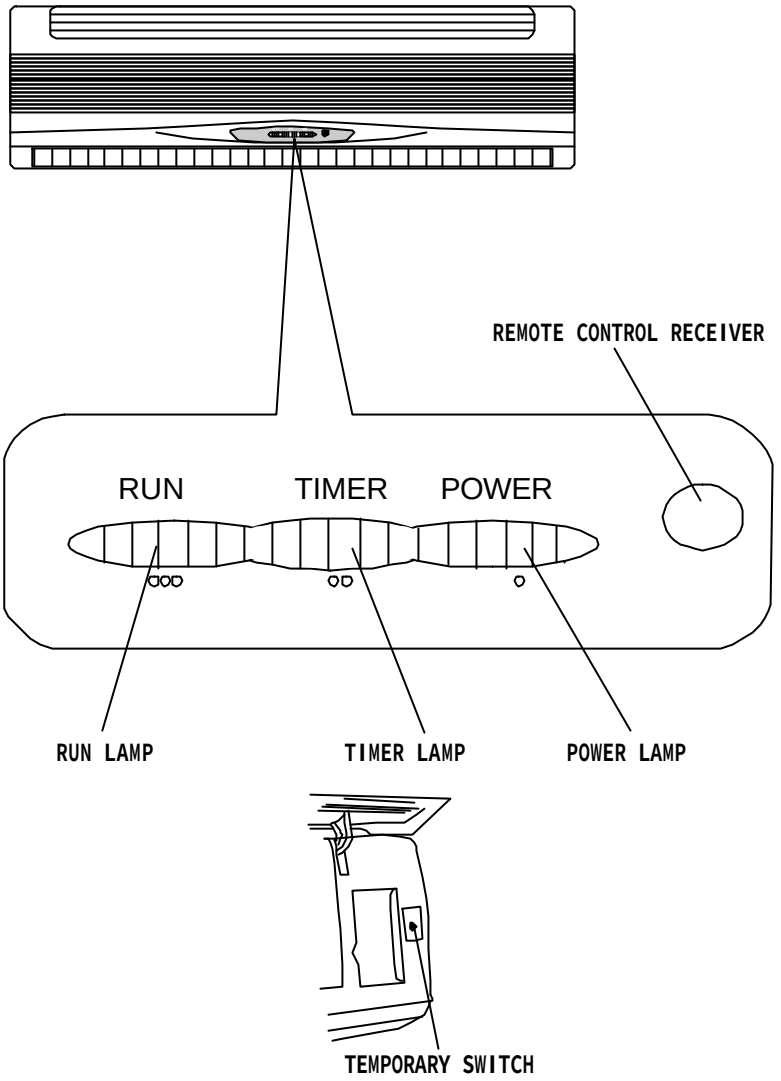
1.PART NAMES AND FUNCTIONS



Thisairconditionerconsistsofanindoorunitandanoutdoorunit.Youcan controltheairconditionerwiththeremotecontrolunit.

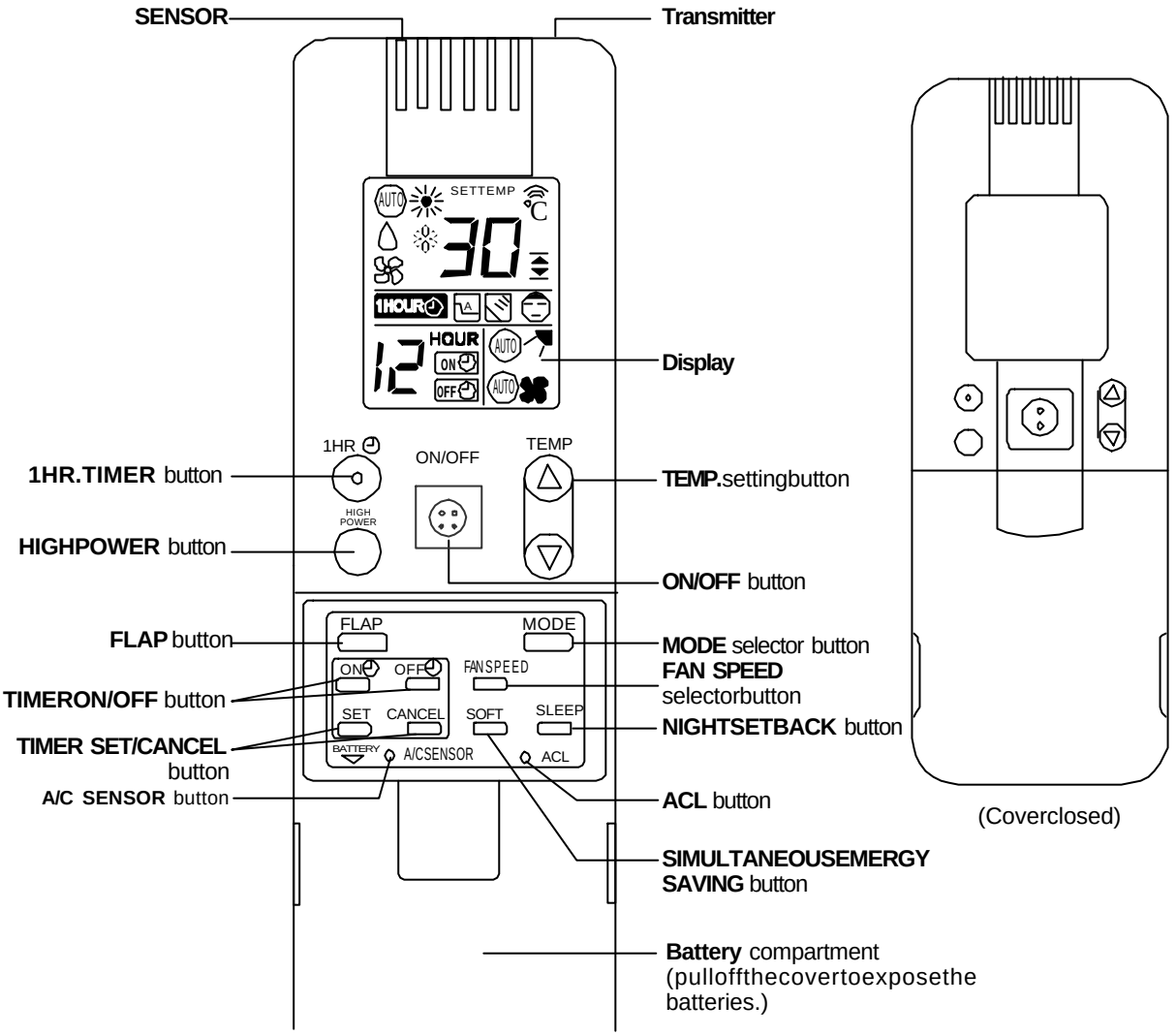
AirIntake	Airfromtheroomisdrawnintothissectionandpasses throughairfilterswhichremovedust.
AirOutlet	Conditionedairisblownoutoftheairconditionerthrough theairoutlet.
RemoteControlUnit	ThewirelessremotecontrolunitcontrolspowerON/OFF, operationmodeselection,temperature,fanspeed,timer setting, andairsweeping.
RefrigerantTubes	Theindoorandoutdooruntsareconnectedbycopper tubesthroughwhichrefrigerantgasflows.
Outdoor(Condensing)Unit	Theoutdoor unit containsthecompressor,fanmotor,heat exchangercoil,andotherelectricalcomponents.
DrainHose	Moistureintheroomcondensesand drainsoffthroughthishose

1.PART NAMES AND FUNCTIONS



REMOTECONTROL receiver	This section picks up infrared signals from the remote control unit (transmitter)
POWER lamp	This lamp lights when the air conditioner is in the operation mode.(But thecompressormaynotrunatthistime.). NOTE:purple lamp is lighte in heatingmode,bluelampis lighted in othermode.
TIMER lamp	Thislamplightswhenthesystem isbeingcontrolledbythetimer.
RUN lamp	Thislamplightswhenthe compressor iselectrified. NOTE:green lampislightedinlowfrequency;orangelampislighted in normal condition; red lamp is lighted in high frequency or high powermode.
TEMPORARYSWITCHbutton	Thisbuttonissetforemergent state.Pleaseusetheremote control unittooperatetheairconditionerinthecommonstate.Ifyouhave lost the remote control unit or it has trouble, use thisbutton to turn on/offyou air conditioner.(See operation withoutthe remote control unit.)

1.PART NAMES AND FUNCTIONS



NOTE **Theillustrationabovepicturestheremotecontrolunitafterthecoverha been loweredandremoved.**

Transmitter	Whenyoupressthebuttonsontheremotecontrolunit,the ⌔ mark appearsin thedisplaytotransmitthesettingchangesto thereceiverintheairconditioner.
SENSOR	A temperature sensor inside the remote control unit senses the room temperature.
Display	Informationontheoperatingconditionsisdisplayedwhiletheremotecontrol unitisswitchedon.Iftheunitisturned off,onlythe modethatwasset previouslyisstilldisplayed.
SLEEP button	Fordetails,see Night SetbackMode .Whenyoupressthisbutton,inthe HEAT,DRYorCOOLmode,the 😴 markappearsinthedisplay,theremote controlunitwillautomaticallyaduestthesettemperaturetosaveenergy.
TEMP. Setting buttons	Pressthe △ buttontoincreasethesettemperature. Pressthe ▽ buttontoreducethesettemperature.
ON/OFF operation button	Thisbuttonisforturningtheairconditioneronandoff.

2、SPECIFICATION

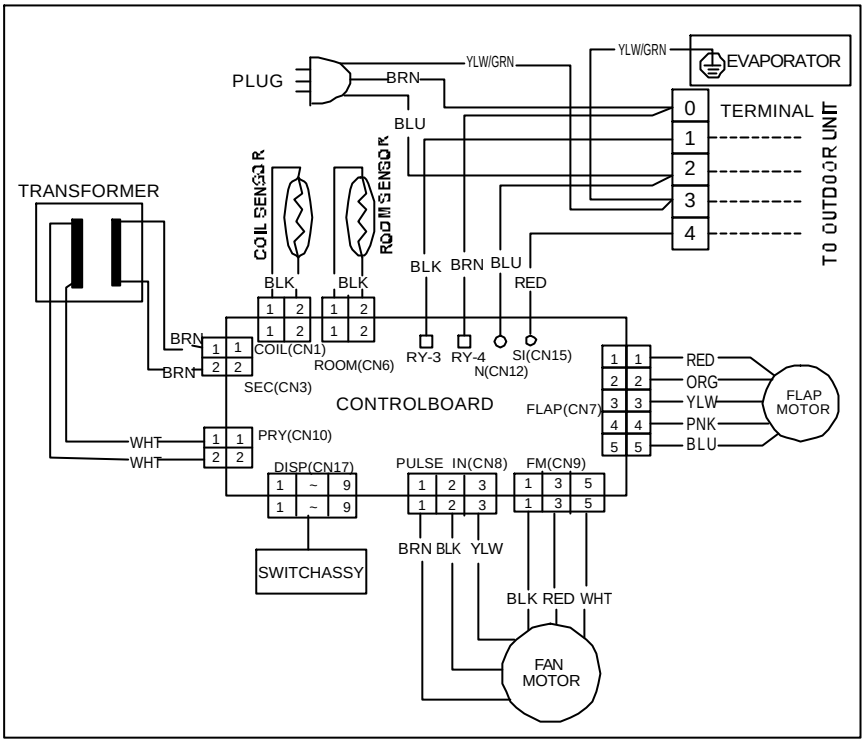
Model				KFR-2688GW/BPE	
Function				Cooling	Heating
Power supply				a.c 220V~230V/50Hz	
Capacity	Capacity		kW	2.6	3.6
	Dehumidification		l /h	1.0	—
	Air flow		m^3/h	380	400
Electrical data	Power outlet		A	16	
	Running current		A	5	8
	Power input		kW	0.9	1.25
	Auxiliary heater		A(KW)	—	
	Starting current		A	22	
	Compressor motor current		A	5	
Coefficient of performance(C.O.P)				2.9	
Compressor	Model			C-1RB102H12AA	
	Output		W	550	
	Winding resistance (at20℃)		Ω	T-R(1.326) T-S(1.360) R-S(1.268)	
Indoor fan motor	Model			YZW16W-4-411	
	Winding resistance (at20℃)		Ω	340（main） 395(assistant)	
Outdoor fan motor	Model			YDK29-62	
	Winding resistance (at20℃)		Ω	Palm-white(230) white-pink(178)	
Dimensions	Indoor unit	Width	mm	805	
		Height	mm	186	
		Depth	mm	270	
	Outdoor uni	Width	mm	867	
		Height	mm	568	
		Depth	mm	290	
Weight	Indoor unit		kg	7.5	
	Outdoor unit		kg	35.0	
Refrigerant piping	Liquid pipe		mm	6.35	
	Gas pipe		mm	9.52	
Protection Level (Outdoor unit)				IP24	
Special remarks	Max Press(Mpa)			4.15	
	Sound level (Hi)	Indoor unit	dB	39/33	
		Outdoor unit	dB	48/41	
	Fan speed (Hi)	Indoor unit	rpm	1230	
		Outdoor unit	rpm	785	
	Fan speed regulator	Indoor unit		3	
		Outdoor unit		3	
	Refrigerant filling capacity(R22A)		kg	0.7	
	Thermitstor	RT1(at25℃)	kΩ	58	
		RT2(at25℃)	kΩ	5.3	
		RT3(at0℃)	kΩ	5	

NOTE :Test conditions：Cooling： Indoor: DB27℃/ WB19℃ Heating: Indoor: DB20℃/ WB15℃
Outdoor DB35℃/ WB24℃ Outdoor DB7℃/ WB 6℃

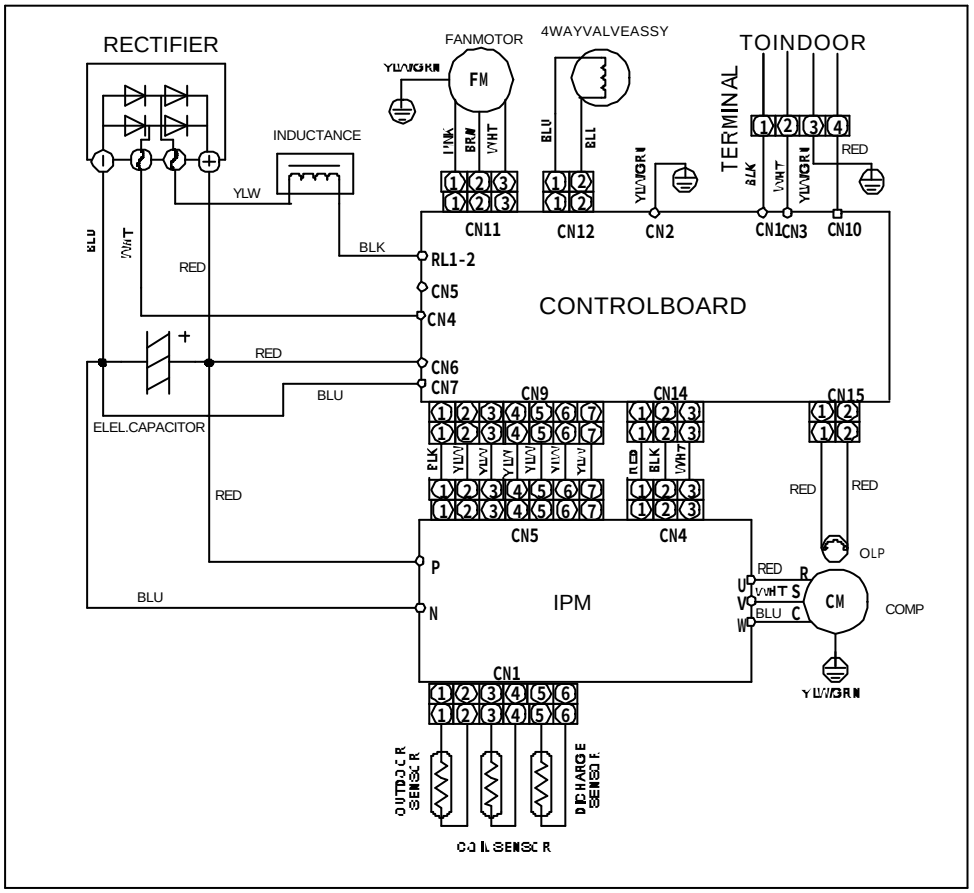
4.PART NAMES AND FUNCTIONS

4.ELECTRIC WIRINGDIAGRAMS

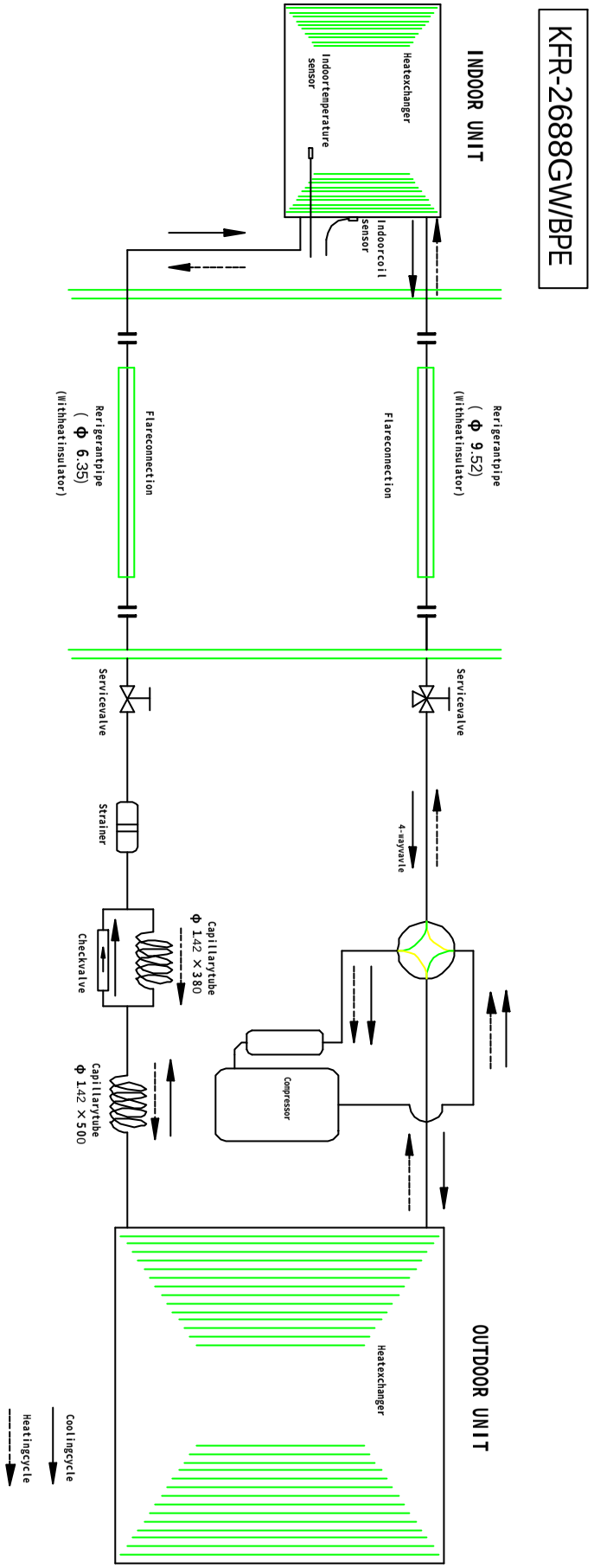
INDOORUNIT



OUTDOORUNIT



5.REFRIGERANT SYSTEM DIAGRAM

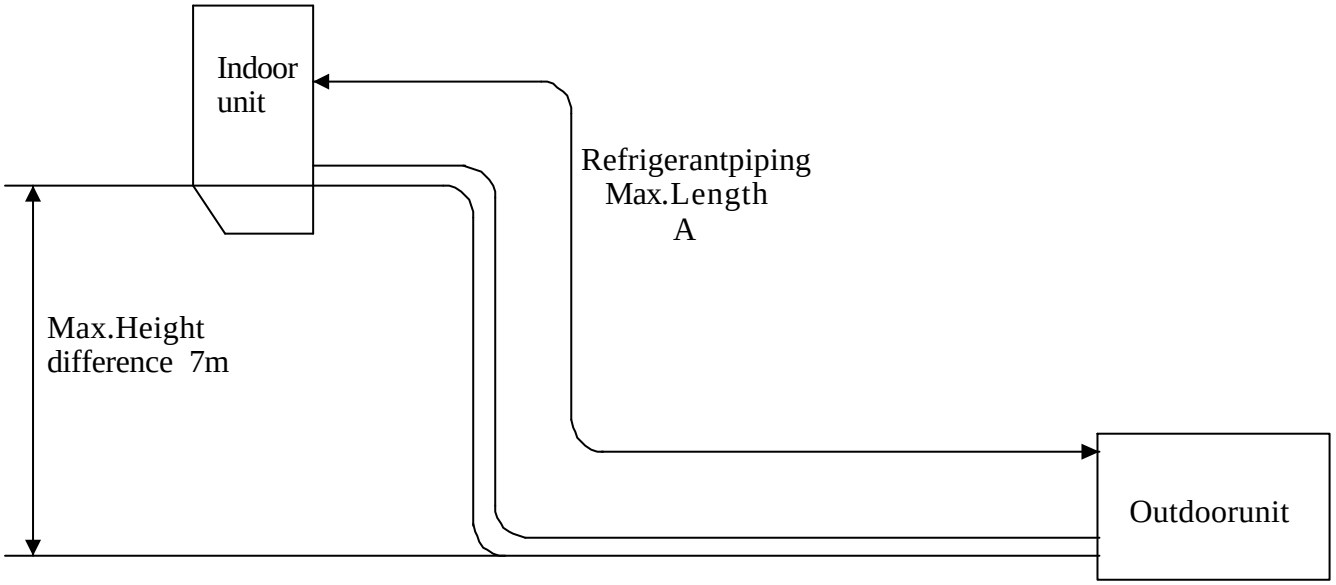


5.REFRIGERANT SYSTEM DIAGRAM

MAX.REFRIGERANT PIPING LENGTH

Modles	Refrigerant Piping Max.Length:m A	Piping size (OD):mm		Lengthofconnectingpipe:m	
		Gas	Liquid	Indoor unit	Outdoorunit
KFR-2688GW/BPE	15	9.52	6.35		

MAX.HEIGHT DIFFERENCE



ADDITIONAL:REFRIGERANT CHARGE(R-410A: g)

Modles	Outdoor unitprecharged (up to 7m)	Refrigerant piping length (one way)		
		7m	10m	15m
KFR-2688GW/BPE	700	0	75	200

Canculation:Xg=25g/m*(A-7)m

5.REFRIGERANT SYSTEM DIAGRAM

EVACUATION PROCEDURES

Connecttherefrigerantpipes (boththeliquidandgas pipes)between theindoorandtheoutdoorunits.

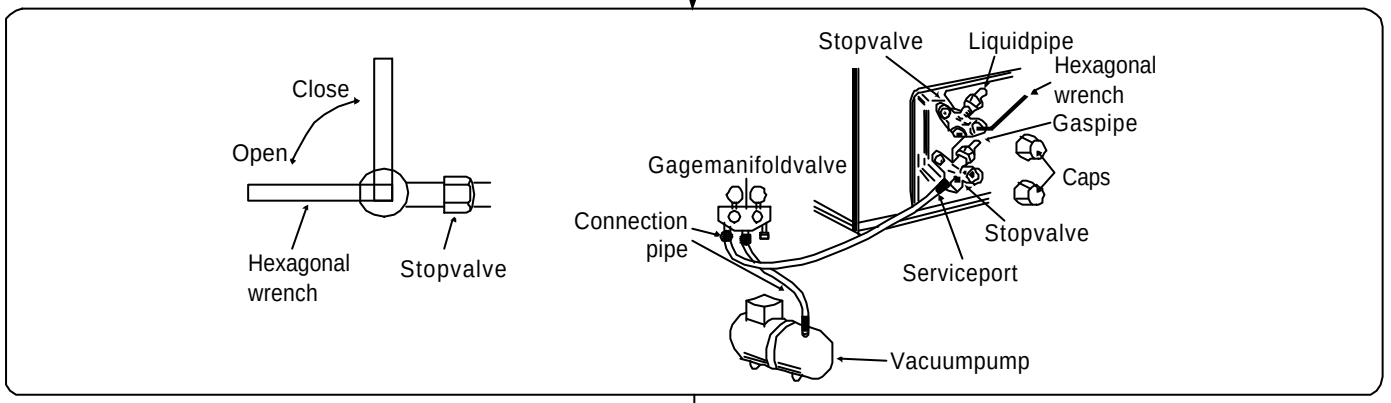
Removetheserviceport capofthestopvalveonthesideofthe outdoorunit gaspipe.(Thestopvalvewillnotwork inits initial statefreshoutofthefactory(totallyclosedwithcapon).

Connectthegagemanifoldvalveandthevacuumpumptotheserviceportofthestopvalveonthegaspipe sideoftheoutdoorunit.

Runthevacuumpumpformorethan15minutesandatthistimeconfirmthatthepressuregageindicates -0.1Mpa(-76cmHg).

Checkthevacuumwiththegagemanifoldvalve,thenclosethegagemanifoldvalve,andstopthe vacuumpump.

Leaveitasisforoneortwominutes.Makesurethepointerofthegagemanifoldvalveremainsinthe. sameposition.



Removethegagemanifoldvalvequicklyfromtheserviceportofthestopvalve.

Afterrefrigerantpipes areconnectedandevacuated,fullyopenallstopvalves ongasandliquidpipesides.
Operatingwithoutfullyopeninglowerstheperformanceandcausestrouble.

Pipelength 7mmaximum Nogaschargeis needed.

Pipelength exceeding7m Chargetheprescribed amountofgas.

Tightenthecaptotheserviceporttoobtaintheinitialstatus.

Retightenthecap.

Leaktest

6.CONTROL MODE

1.Display panel

1.1 Description of pattern

1.2 The display screen consists of 3 LEDs, indicating power, time set, operation.

1.3 Power indicator. When the air conditioner runs, the power indicator lamp lights up;Compressor operation indicator. When the compressor runs, the operation indicator lamp lights up;

1.4 Timer indicator. When the timer function works, the timer indicator lamp lights up;

2. Temporary Switch

2.1 Press the temporary switch to start the unit, and press it once again to stop the unit; the control unit makes a judge according to the room temperature to select the corresponding run mode. Once a run mode is selected, it will not be changed unless the unit is cut off and powered on again.

A. When the room temperature＞26℃, the unit starts in the cooling mode; the indoor controlled temperature is set at 26℃, and the indoor fan speed is set to automatic mode;

B. When the room temperature＜23℃, the unit starts in the heating mode; the indoor controlled temperature is set at 23℃, and the indoor fan speed is set to the automatic mode;

C. When 23℃≤the room temperature≤26℃, the air blowing mode starts, and the indoor fan speed is set to automatic;

2.2 When the air conditioner is powered on, hold down the temporary switch for 5 seconds or longer, the control unit starts the test operation, when the system is forced to run in the cooling mode regardless of the room temperature.

2.3 Hold down the temporary switch and then turn on the air conditioner, the buzzer on the indoor unit rings two times, and the unit enters in the self-test status.

2.4 If a signal has been received from the remote controller during the temporary run, the

system will operate according to the commands of the remote signal.

6.CONTROL MODE

Automatic mode

3.1 When the remote controller is set to start the unit in the automatic mode, the air conditioner judges according to the differences between the room temperature and temperature setting and selects a run mode.

Indoor temperature≥temperature setting, the unit runs in the cooling mode;

Indoor temperature＜temperature setting, the unit runs in the heating mode.

3.2 The run mode is determined when the unit gets started at the first time. Once a mode is selected, it will not change within 30 minutes.

3.3 If the difference between the room temperature and temperature setting is above 3℃, the run mode can be changed immediately.

3.4 When the unit is turned off and restarted with the remote controller, these conditions remain valid.

3.5 When powered off and powered on again, the air conditioner will reselect a run mode.

3.6 The indoor and outdoor fan speed and compressor control in the automatic mode are same as that in the heating and cooling mode.

3.7 After being set to the cooling only type in EE, the heating mode does not work.

4 Cooling mode

4.1 In the cooling mode, the temperature setting is selected by using the remote controller. The temperature control ranges from 16-30℃.

4.2 When powered on for the first time, the compressor can be started immediately. After turning off, the compressor must not be restarted until at least 3 minutes later.

4.3 After turning on, the compressor must run for at least 5 minutes.

6.CONTROL MODE

Automatic:

	$T_{setting}$- T_{indoor}	Fan speed		$T_{setting}$ – T_{indoor}	Fan speed
↓ Direction of Temperature Difference	0℃	Mute	↑ Direction of Temperature Difference	0℃	Mute
	1℃	Low		1℃	Low
	2℃	Low		2℃	Low
	3℃	Low		3℃	Low
	4℃	Low		4℃	High
	≥5℃	High		≥5℃	High

4.4 Outdoor fan speed

Single-speed motor starts or stops as soon as the compressor starts or stops.

4.6 The 4-way valve is interrupted.

4.7 Anti-freezing for evaporator

If 3℃≤the indoor coil temperature≤7℃ Frequency up restriction

If -1℃≤the indoor coil temperature≤3℃ Frequency down

If the indoor coil temperature≤-1℃ Compressor stops and displays the trouble

5. **Dehumidification mode**

5.1 In the dehumidification mode, the temperature setting is selected by using the remote controller. The temperature control ranges from 16-30℃.

The control unit selects a run mode according to the temperature difference between the room temperature and temperature setting.

5.2 When the room temperature is above 2℃ higher than the temperature setting, the system runs in the cooling mode.

5.3 When the difference between the room temperature and temperature setting is equal to or lower than 2℃, the system starts in the dehumidification mode. the compressor will alternate between the low (10minutes) and high(6minutes) frequencies.

5.4 When dehumidification, the outdoor fan starts or stops as soon as the compressor starts or stops.

6.CONTROL MODE

Outdoor temperature ≥ 28℃:	High
Outdoor temperature < 28℃ and condenser temperature ≥ 40℃:	High
Outdoor temperature < 28℃ and 40℃ > condenser temperature ≥ 35℃:	Mid
Outdoor temperature < 28℃:	Low

6. Heating mode

6.1 In the heating mode, the temperature setting is determined with the remote controller. The temperature control ranges from 16-30℃.

6.2 When powered on for the first time, the compressor may be started immediately. After turning off, the compressor must not be restarted until at least 3 minutes later.

6.3After turning on, the compressor must operate at least 5 minutes.

6.4 When the air conditioner turns off, the compressor is interrupted; the outdoor 4-way valve turns off after a 1 minutes and 40 seconds delay; and the indoor fan stops after a 40 seconds delay to blow out the residual heat.

6.5 Cold air prevention function. When the air conditioner turns on, the indoor unit does not start immediately. When the heat exchanger temperature rises above 28℃, the fan operates at the ultra-low fan speed, and the flap is opened to the position 1; when the heat exchanger temperature≧38℃ or runs for over 4 minutes, the fan runs at a preset fan speed, and the flap is opened to a preset position. When the indoor heat exchanger temperature drops below 23℃, the indoor fan stops.

6.6 When the unit is running, the indoor fan stops 40 seconds after the compressor is interrupted because the room temperature has reached the temperature setting. When the compressor is in operation again, the cold air prevention function still works.

6.7 In the heating mode, the outdoor fan starts or stops as soon as the compressor starts or stops unless the indoor heat exchanger overheat protection starts.

Outdoor temperature ≥ 24℃:	Low
15℃≥Outdoor temperature≥ 10℃:	Mid
Outdoor temperature < 10℃:	High

6.8 The 4-way valve is activated.

6.9 Indoor heat exchanger overload protection

$T_{indoor\ coil}$≥70℃, the compressor will stop;

$T_{indoor\ coil}$≥55℃, the outdoor flow speed will turn to the low speed, and the compressor runs at the descending frequency;

55℃≥$T_{indoor\ coil}$≥52℃, the compressor will prohibit the frequency from rising.

6.CONTROL MODE

Automatic

	$T_{setting}$-T_{room}	Fan speed		$T_{setting}$- T_{room}	Fan speed
↓ Direction of Temperature Difference	1℃	Low	↑ Direction of Temperature Difference	1℃	Low
	2℃	Medium		2℃	Low
	3℃	Medium		3℃	Medium
	4℃	Medium		4℃	Medium
	5℃	High		5℃	Medium
	≥6℃	High		≥6℃	High

7 Defrosting mode (only applicable to the model with heat pump for cooling and heating).

7.1 Frost is removed by reverse of the 4-way valve.

7.2 Conditioner for entering in the defrosting mode:

when the heating mode continues for more than minutes and $T_{outdoorl}$ -$T_{outdoor\ coil}$ ≥7℃ for more than 5 minutes .

7.3 Defrosting procedures:

Both the compressor and outdoor fan motor are interrupted.

→ 50 seconds later, the 4-way valve turns off.

→ 5 seconds later, the compressor gets started.

→ $T_{outdoor\ coil}$ ≥12℃ or the compressor runs for more than 6 minutes, the compressor will stop.

→ 30 seconds later, the 4-way valve turns on.

→ 5 seconds later, compressor starts.

→ 3 seconds later, outdoor fan starts.

→ Defrosting ends.

8. Fan mode

When select the fan mode,only both the indoor fan and flap operate in a preset mode. If the fan speed is set to “automatic”, the fan runs at the low speed.

6.CONTROL MODE

Flap control

9.1 Press the up and down flap button, the flap's position is switched over between the 8 statuses, i.e. automatic flap, flap orientation where the flap plate opens to 6 positions 1, 2, 3, 4, 5, 6 from down to up, and flap swing.

9.2 Automatic flap: In the heating mode, the flap swings between position 1 and position 4; In the cooling or dehumidification mode, the flap swings between position 3 and position 6; In the fan mode, the flap is located at to position 5.

9.3 Flap orientation: The flap is set at a certain position by using the remote controller.

9.4 Flap swing: The flap swings between position 1 and position 6.

9.5 The default status is the "automatic flap".

9.6 When powered on and off for the first time, the flap plate turns to the maximum angle to ensure that the flap is closed; When the unit starts, the flap plate moves to the maximum angle, and returns to the preset position after the flap is completely closed.

10. Man-machine communication

10.1 The indoor control unit has two thermal sensors for detecting the room temperatures, one is installed in the remote controller, and the other at the air intake of the indoor unit. The default air outlet setting is subject to the remote controller's detection. The remote controller detects the room temperature once every 20 seconds, and automatically transmits the signal at 3-minute intervals or when it has detected a change in the room temperature. If the indoor control unit has not received a remote signal for more than 10 minutes, the control function will be automatically switched over to the temperature sensor at the air intake.

10.2 Neither turning on nor turning off operations will cancel the man-machine communication function.

10.3 In default, the air conditioner is set to start the man-machine communication function.

11. Timer function

11.1 Timer on: When set to start in the set time with the remote controller, the air conditioner enters in the timer on status. When the set time is up, the air conditioner turns on and operates according to the preset conditions after receiving the signal from the remote controller. If the air conditioner has not received the signal of the remote controller when the set time is up, it will automatically start and operate according to the preset conditions.

11.2 Timer off: When set to stop in the set time with the remote controller, the air

conditioner enters the timer off status. When the set time is up, the air conditioner turns off after receiving the signal from the remote controller. If the air conditioner has not received the signal of the remote controller when the set time is up, it will turn off automatically.

11.3 Neither turning on nor turning off operations will cancel the timer function.

12. Sleep function

12.1 In the heating or cooling mode, press the "Sleep" button on the remote controller to start or cancel the sleep function in sequence.

12.2 In the heating mode, 1 hour after the sleep mode starts, the temperature setting will decrease by 3℃. After another 2 hours, the temperature decreases by 4℃ further. The unit will continue to run for further 5 hours and then stops automatically.

12.3 In the cooling mode, 1 hour after the sleep mode starts, the setting temperature will rise by 1℃. The unit will continue to run for further 7 hours and then automatically stops.

12.4 In default, the preset status is to cancel the sleep function. Turning off the unit will also cancel the sleep function.

Note: This function is subject to the description in the User's Manual.

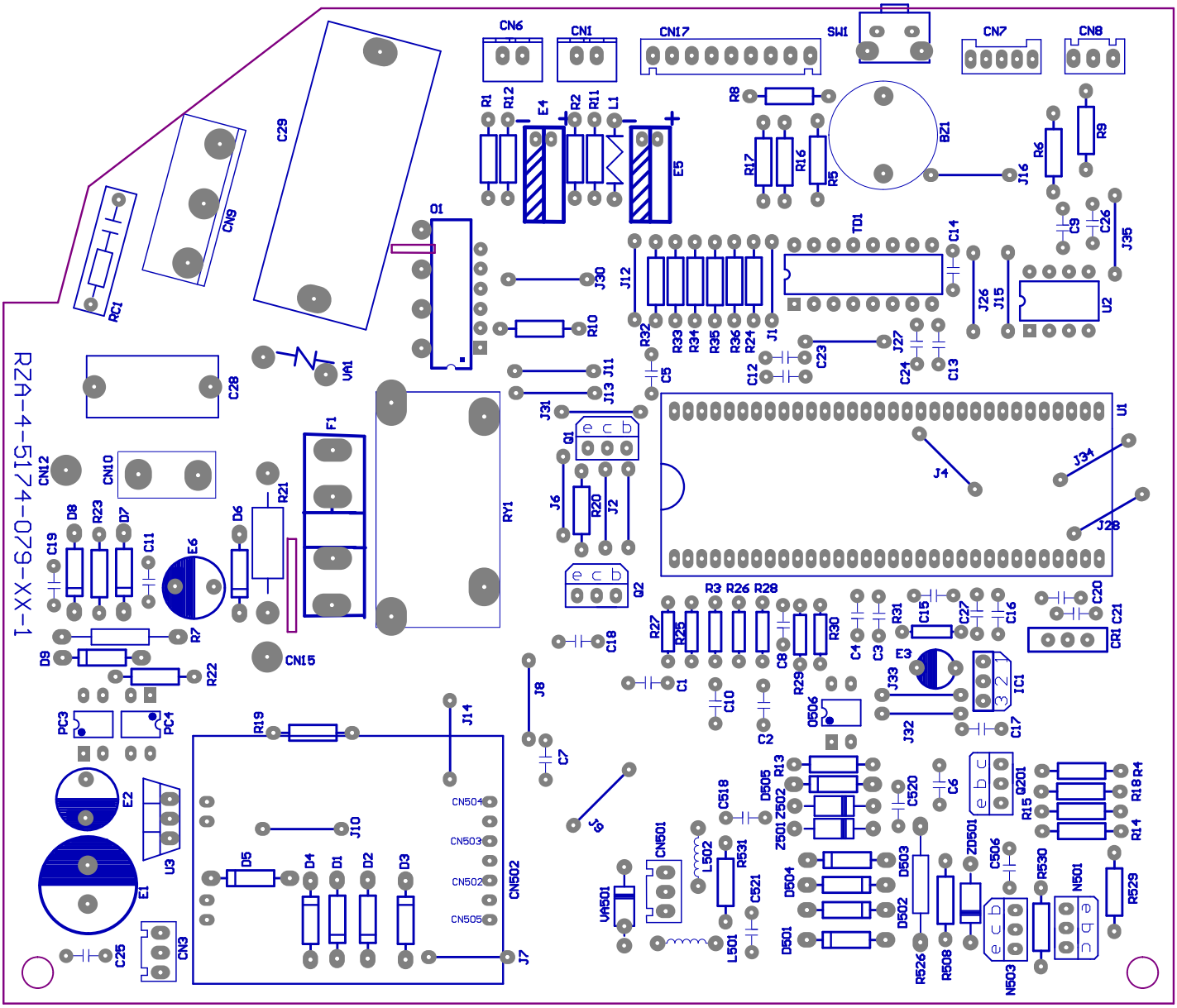
13. Instruction of troubleshooting

When the air conditioner works in the abnormal condition, please press the sensor button of the remote controller one time and then press this button continuously two time, the trouble (the LED lamp lights up or flickers) will be displayed on the display panel.

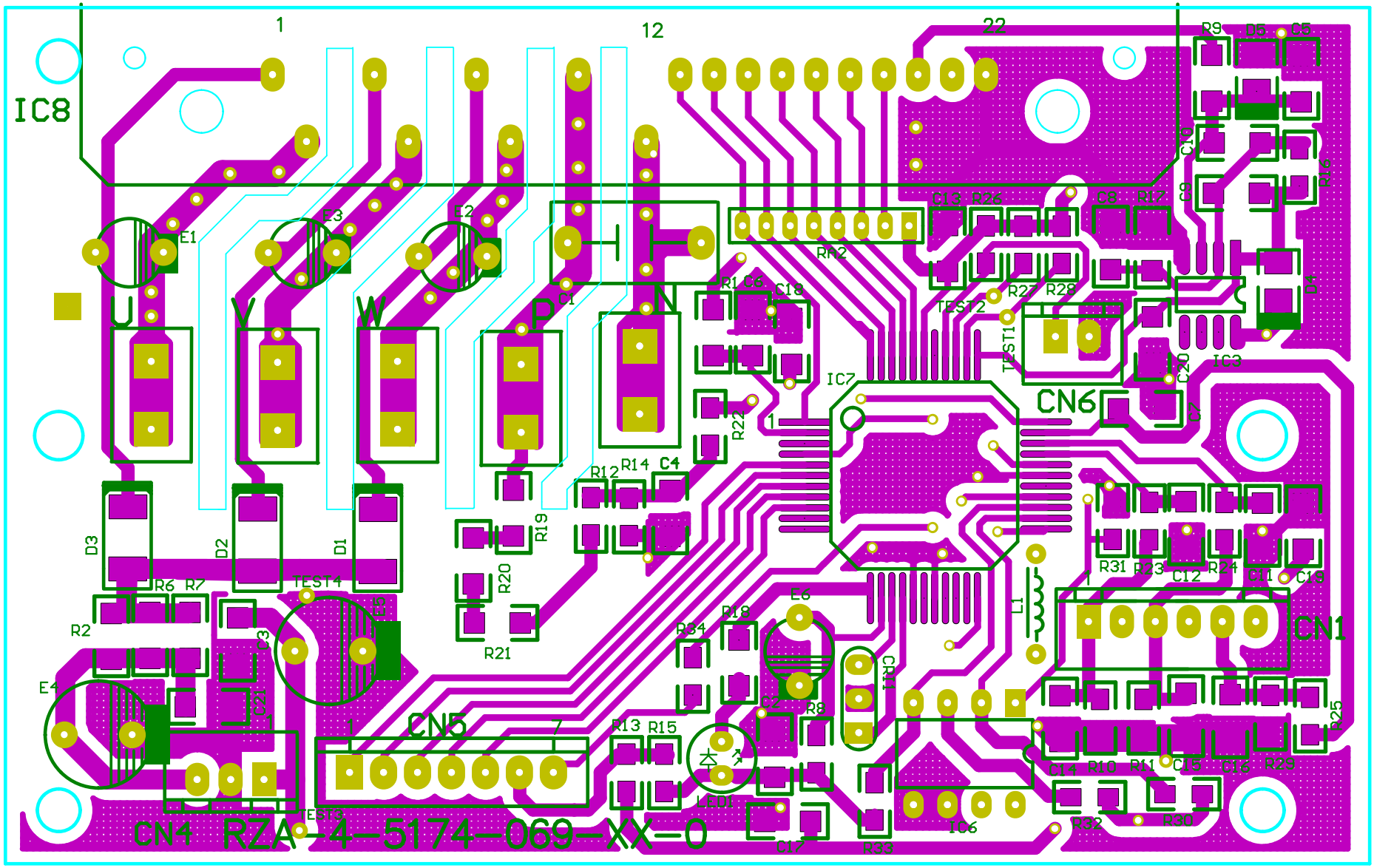
Content of trouble	LED lamp			
	Timer lamp	Running lamp（blue）	Running lamp(red)	Power lamp
Indoor sensor trouble				☆
Evaporator sensor trouble			☆	
Evaporator freezing			☆	☆
Over hot of indoor heat exchanger		☆		
Communication trouble		☆		☆
Power failure instantaneously		☆	☆	
Over current of compressor		☆	☆	☆
Fan motor trouble	☆			
Outdoor sensor trouble				★
Outdoor coil sensor trouble			★	

Over current of whole system		★	★	
No load		★	★	★
Abnormal power voltage	★			
Overload of outdoor unit for cooling	★		★	
Defrosting	★		★	★
IPM trouble	★	★		
Data failure of outdoor E^2PROM	★	★		★

7 INDOOR CONTROL BOARD



7 OUTDOOR CONTROL BOARD



8.SENSOR PARAMETER

THE PARAMETER OF THE INDOOR SENSOR

T('c)	R(Ko)	V(v)	T('c)	R(Ko)	V(v)	T('c)	R(Ko)	V(v)
-10	27.68	0.7258	7	11.52	1.4488	24	5.226	2.3675
-9	26.22	0.76	8	10.97	1.4997	25	5	2.4227
-8	24.85	0.7953	9	10.45	1.5512	26	4.785	2.4776
-7	23.56	0.8316	10	9.963	1.6027	27	4.581	2.5321
-6	22.34	0.8691	11	9.497	1.6553	28	4.387	2.5861
-5	21.19	0.9077	12	9.056	1.7083	29	4.202	2.6399
-4	20.11	0.9472	13	8.638	1.7619	30	4.025	2.6934
-3	19.09	0.9878	14	8.241	1.8159	31	3.857	2.7463
-2	18.12	1.0298	15	7.865	1.8703	32	3.697	2.7986
-1	17.21	1.0726	16	7.508	1.925	33	3.545	2.8502
0	16.35	1.1164	17	7.169	1.9799	34	3.399	2.9016
1	15.54	1.1611	18	6.847	2.0352	35	3.26	2.9523
2	14.77	1.207	19	6.541	2.0906	36	3.128	3.002
3	14.05	1.2533	20	6.251	2.1459	37	3.002	3.0512
4	13.36	1.3012	21	5.975	2.2014	38	2.881	3.0999
5	12.72	1.349	22	5.712	2.257	39	2.766	3.1476
6	12.1	1.3988	23	5.463	2.3123	40	2.657	3.1942

THE PARAMETER OF THE COIL AND OUTDOOR SENSOR

T('c)	R(Ko)	V(v)	T('c)	R(Ko)	V(v)	T('c)	R(Ko)	V(v)
-20	39.58	0.5307	9	10.1	1.5878	38	3.265	2.9504
-19	37.58	0.5558	10	9.684	1.6338	39	3.151	2.9932
-18	35.69	0.5818	11	9.284	1.6805	40	3.041	3.0358
-17	33.91	0.6087	12	8.903	1.7276	41	2.936	3.0775
-16	32.23	0.6363	13	8.54	1.7749	42	2.835	3.1188
-15	30.65	0.6648	14	8.194	1.8226	43	2.739	3.159
-14	29.15	0.6942	15	7.864	1.8704	44	2.646	3.199
-13	27.74	0.7244	16	7.549	1.9185	45	2.556	3.2387
-12	26.4	0.7556	17	7.249	1.9667	46	2.471	3.2771
-11	25.14	0.7875	18	6.962	2.0151	47	2.388	3.3155
-10	23.95	0.8202	19	6.688	2.0636	48	2.309	3.3528
-9	22.82	0.8539	20	6.427	2.112	49	2.233	3.3896
-8	21.75	0.8885	21	6.178	2.1603	50	2.159	3.4262
-7	20.74	0.9237	22	5.939	2.2089	51	2.089	3.4615
-6	19.79	0.9596	23	5.712	2.257	52	2.021	3.4965
-5	18.88	0.9966	24	5.494	2.3053	53	1.956	3.5306
-4	18.02	1.0343	25	5.286	2.3533	54	1.893	3.5644
-3	17.2	1.0731	26	5.086	2.4014	55	1.832	3.5977
-2	16.43	1.1122	27	4.896	2.4489	56	1.774	3.6299
-1	15.7	1.152	28	4.714	2.4963	57	1.718	3.6616
0	15	1.1929	29	4.539	2.5436	58	1.664	3.6926
1	14.34	1.2342	30	4.372	2.5904	59	1.612	3.7231
2	13.71	1.2765	31	4.212	2.6369	60	1.562	3.7528
3	13.11	1.3195	32	4.059	2.683	61	1.513	3.7824
4	12.55	1.3623	33	3.912	2.7288	62	1.467	3.8106
5	12.01	1.4063	34	3.772	2.7738	63	1.422	3.8386
6	11.5	1.4506	35	3.637	2.8188	64	1.379	3.8658
7	11.01	1.4959	36	3.508	2.8631	65	1.337	3.8927
8	10.55	1.541	37	3.384	2.907			

8.SENSOR PARAMETER

THE PARAMETER OF THE DISCHARGE SENSOR

T('C)	R(O)	V(v)	T('C)	R(O)	V(v)	T('C)	R(O)	V(v)
-10	313.4	0.3	31	44.74	1.545	71	9.659	3.372
-9	297.2	0.315	32	42.89	1.59	72	9.331	3.409
-8	281.9	0.331	33	41.13	1.636	73	9.016	3.446
-7	267.5	0.348	34	39.44	1.682	74	8.712	3.483
-6	253.9	0.365	35	37.84	1.729	75	8.421	3.519
-5	241.1	0.383	36	36.3	1.776	76	8.14	3.554
-4	229	0.402	37	34.84	1.823	77	7.869	3.588
-3	217.6	0.421	38	33.44	1.871	78	7.609	3.622
-2	206.8	0.441	39	32.11	1.919	79	7.359	3.655
-1	196.6	0.462	40	30.83	1.967	80	7.118	3.688
0	186.9	0.483	41	29.61	2.016	81	6.885	3.72
1	177.8	0.506	42	28.45	2.064	82	6.662	3.751
2	169.2	0.529	43	27.34	2.112	83	6.446	3.781
3	161	0.552	44	26.27	2.161	84	6.239	3.811
4	153.3	0.577	45	25.25	2.21	85	6.039	3.84
5	146	0.602	46	24.28	2.258	86	5.846	3.869
6	139	0.629	47	23.35	2.307	87	5.661	3.897
7	132.5	0.656	48	22.46	2.355	88	5.482	3.924
8	126.3	0.684	49	21.6	2.404	89	5.309	3.951
9	120.4	0.712	50	20.79	2.452	90	5.143	3.977
10	114.8	0.742	51	20.01	2.499	91	4.982	4.003
11	109.5	0.772	52	19.26	2.547	92	4.827	4.028
12	104.4	0.804	53	18.54	2.595	93	4.678	4.052
13	99.66	0.836	54	17.85	2.642	94	4.534	4.076
14	95.13	0.869	55	17.19	2.689	95	4.395	4.099
15	90.82	0.902	56	16.56	2.735	96	4.261	4.122
16	86.74	0.937	57	15.96	2.781	97	4.132	4.144
17	82.85	0.972	58	15.38	2.826	98	4.007	4.165
18	79.16	1.008	59	14.82	2.872	99	3.886	4.187
19	75.65	1.045	60	14.29	2.916	100	3.77	4.207
20	72.32	1.083	61	13.78	2.96	101	3.658	4.227
21	69.15	1.122	62	13.28	3.005	102	3.549	4.246
22	66.13	1.161	63	12.81	3.048	103	3.444	4.265
23	63.27	1.201	64	12.36	3.09	104	3.343	4.284
24	60.54	1.242	65	11.93	3.132	105	3.15	4.32
25	57.94	1.283	66	11.51	3.174	106	3.059	4.337
26	55.46	1.325	67	11.11	3.214	107	2.97	4.354
27	53.11	1.368	68	10.73	3.254	108	2.884	4.37
28	50.86	1.411	69	10.36	3.294	109	2.802	4.386
29	48.72	1.455	70	10	3.333	110	2.721	4.401
30	46.68	1.5						