

# **Hisense**

SPLIT TYPE AIR CONDITIONER

## SERVICE MANUAL

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AS-09UR4SVNVG1

AS-12UR4SVNVG1

AS-12UR4SVGVG

AS-18UR4STVVG

AS-24UR4SQJVG

Hisense Corporation

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**NOTE:** The figure、size and parameter of the product may not be identical with the service manual, please take the actual product as the standard.

## 1. OPERATING RANGE

	Temperature	Indoor Air Intake Temp.	Outdoor Air Intake Temp
COOLING	Maximum	32℃ D.B./23℃ W.B.	43 ℃ D.B./26℃ W.B.
	Minimum	21℃ D.B./15℃ W.B.	21 ℃ D.B./15℃ W.B.
HEATING	Maximum	27℃ D.B./18℃ W.B.	24℃ D.B./18℃ W.B.
	Minimum	20℃ D.B./≤15℃ W.B	-7℃ D.B./-8℃ W.B.

## 2. SPECIFICATIONS

### 2-1. Unit specifications

Model No.		AS-09UR4SVNVG1	AS-12UR4SVNVG1	AS-12UR4SVGVG
Type		T1, H/P, INVERTER	T1, H/P, INVERTER	T1, H/P, INVERTER
Ratings				
Cooling Capacity	W	2600(1200-3000)	3200(1200-3500)	3500(1400-3600)
Heating Capacity	W	2900(1200-3500)	3400(1200-4000)	3550(1400-3800)
Rated Input-Cooling	W	810(300-1450)	997(300-1550)	1090(430-1550)
Rated Input-Heating	W	803(300-1500)	942(300-1600)	983(430-1600)
Moisture Removal	L/H.r	0.9	1.5	1.5
Air Circulation	m <sup>3</sup> /h	500	500	550
EER for Cooling	W/W	3.21	3.21	3.21
COP for Heating	W/W	3.61	3.61	3.61
Energy Class	Cooling	A	A	A
Energy Class	Heatling	A	A	A
Refrigerant		R410A	R410A	R410A
Refrigerant charge volume	g	580	790	980
Indoor Unit Noise Level	High(dB (A))	39	39	39
	Low(dB (A))	34	34	34
Outdoor Unit Noise Level	dB (A)	52	52	53
Power Supply				
Voltage, Frequency, Phase	V	220-240V~, 50Hz, 1P	220-240V~, 50Hz, 1P	220-240V~, 50Hz, 1P
Rated Current	Cooling (A)	3.8	4.5	4.8
	Heating (A)	3.7	4.1	4.3
System				
Compressor type		Rotary	Rotary	Rotary
Compressor Model No.		39A23VPM&5JKE	39A23VPM&5JKE	DA108M1C-10FZ2
Compressor MFG		RECHI	RECHI	GMCC
Expansion Device		Capillary	Capillary	Capillary
Evaporator		Copper tube and Aluminum Fin	Copper tube and Aluminum Fin	Copper tube and Aluminum Fin
Condenser		Copper tube and Aluminum Fin	Copper tube and Aluminum Fin	Copper tube and Aluminum Fin
Connecting Pipe Diameter				
Liquid Pipe	inch	1/4	1/4	1/4
Gas Pipe	inch	3/8	3/8	3/8
Features				
Display on Front Panel		LED	LED	LED
LCD Wireless Remote Controller		Yes	Yes	Yes
Removable and washable Panel		Yes	Yes	Yes
Washable PP Filter		Yes	Yes	Yes
24 Hours Timer		Yes	Yes	Yes
3 Speed and Auto Indoor Fan Control		Yes	Yes	Yes
Vertical Auto Swing Louver		Yes	Yes	Yes
Manual Adjustable Horizontal Swing Louver		Yes	Yes	Yes
Sleep Operation		Yes	Yes	Yes
Smart Function		Yes	Yes	Yes

## 2. SPECIFICATIONS

Dimmer		Yes	Yes	Yes
Super Function		Yes	Yes	Yes
Compressor Indicator		Yes	Yes	Yes
Auto Restart		Yes	Yes	Yes
Other				
Net Dimensions WxHxD (mm)	Indoor Unit	750×250×190	750×250×190	820X270X210
	Outdoor Unit	715×482×240	715×482×240	715×482×240
Net Weight (Kg)	Indoor Unit	8	8	8.5
	Outdoor Unit	26	28	27
Packing Dimensions WxHxD (mm)	Indoor Unit	800×325×245	800×325×245	880x340x285
	Outdoor Unit	830×530×315	830×530×315	830×530×315
Gross Weight (Kg)	Indoor Unit	9	9	9.5
	Outdoor Unit	28	30	29
Loading Capacity (20'/40'/40'HC )		148/298/350	148/298/350	130/262/307
Test Standard		EN 14511	EN 14511	EN 14511
Approvals		CE	CE	CE

Model No.		AS-18UR4STVVG	AS-24UR4SQJVG
Type		T1, H/P, INVERTER	T1, H/P, INVERTER
Ratings			
Cooling Capacity	W	5275(1817-5862)	7034(2198~7913)
Heating Capacity	W	5569(1758-6741)	8206(2198~8792)
Rated Input-Cooling	W	1550(480-2400)	2190(1400~3100)
Rated Input-Heating	W	1540(480-2500)	2400(1400~3400)
Moisture Removal	L/H.r	2.0	2.4
Air Circulation	m³/h	900	950
EER for Cooling	W/W	3.4	3.21
COP for Heating	W/W	3.61	3.42
Energy Class	Cooling	A	A
Energy Class	Heatling	A	B
Refrigerant		R410A	R410A
Refrigerant charge volume	g	1700	1950
Indoor Unit Noise Level	High(dB (A))	47	48
	Low(dB (A))	42	43
Outdoor Unit Noise Level	dB (A)	56	58
Power Supply			
Voltage, Frequency, Phase	V	220-240V~,50Hz,1P	220-240V~,50Hz,1P
Rated Current	Cooling (A)	7.6	10
	Heating (A)	7.4	10.5
System			
Compressor type		Rotary	Rotary
Compressor Model No.		DA130S1C-20FZ	C-7RVN153HOW
Compressor MFG		GMCC	SANYO
Expansion Device		Capillary	Capillary

## 2. SPECIFICATIONS

Evaporator		Copper tube and Aluminum Fin	Copper tube and Aluminum Fin
Condenser		Copper tube and Aluminum Fin	Copper tube and Aluminum Fin
Connecting Pipe Diameter			
Liquid Pipe	inch	1/4	3/8
Gas Pipe	inch	1/2	5/8
Features			
Display on Front Panel		LED	LED
LCD Wireless Remote Controller		Yes	Yes
Removable and washable Panel		Yes	Yes
Washable PP Filter		Yes	Yes
24 Hours Timer		Yes	Yes
3 Speed and Auto Indoor Fan Control		Yes	Yes
Vertical Auto Swing Louver		Yes	Yes
Manual Adjustable Horizontal Swing Louver		Yes	Yes
Sleep Operation		Yes	Yes
Smart Function		Yes	Yes
Dimmer		Yes	Yes
Super Function		Yes	Yes
Compressor Indicator		Yes	Yes
Auto Restart		Yes	Yes
Other			
Net Dimensions WxHxD (mm)	Indoor Unit	920x313x226	1035×313×220
	Outdoor Unit	830x637x285	832×702×312
Net Weight (Kg)	Indoor Unit	11	13
	Outdoor Unit	45	56
Packing Dimensions WxHxD (mm)	Indoor Unit	1010x380x300	1130×390×310
	Outdoor Unit	980×680×400	980x770x420
Gross Weight (Kg)	Indoor Unit	14	16
	Outdoor Unit	49	60
Loading Capacity (20'/40'/40'HC )		79/162/180	66/135/150
Test Standard		EN 14511	EN 14511
Approvals		CE	CE

### 3. INSTALLATION

#### 1、 How to choose an air conditioner:

- a. Choice for reference: 150-170W/m<sup>2</sup> for average rooms;
- b. Choice for reference: 160-200W/m<sup>2</sup> for small size offices;
- c. Choice for reference: 220-350W/m<sup>2</sup> for restaurants;
- d. Choice for reference: 200-300W/m<sup>2</sup> for entertaining venues;
- e. Choice for reference: 220-280W/m<sup>2</sup> for the top floor.

Note: 1W = 3.412btu.

#### 2、 Indoor Unit:

For indoor unit installation, the distance between its top and the ceiling shall not be less than 10 cm -20 cm, and the distance from the ground should be between 2m to 2.6m. Also the wallboard must be smooth and straight, with its supporting force of not less than 60 kg.

The location for installing the indoor unit shall be far away from heat source, the space between it and the door or window should exceed 0.6m

#### 3、 Outdoor Unit:

The air conditioner outdoor unit should not occupy public sidewalks, the distance between the mounting bracket installed along the road (on condition that the mounting bracket does not affect the public access, it can be installed horizontally) and the ground must exceed 2.5m. Also we shall remember that: a. the air flow must run freely. b. we should protect famous ancient buildings during installation. c. the installation does not affect the traffic.

The distance between air outlet of outdoor unit and the opposite object should be more than 1 meter, otherwise the machine would stop running because of overload by heat yield failure.

If the outdoor unit was opposite the resident's door or window, you should install the machine as far as possible away from the adjacent doors windows and plants, and the distance shall not be less than the following values: for the rated cooling capacity not more than 4.5KW, the distance should be 3m.; for the rated cooling capacity more than 4.5KW, the distance should be 4m.

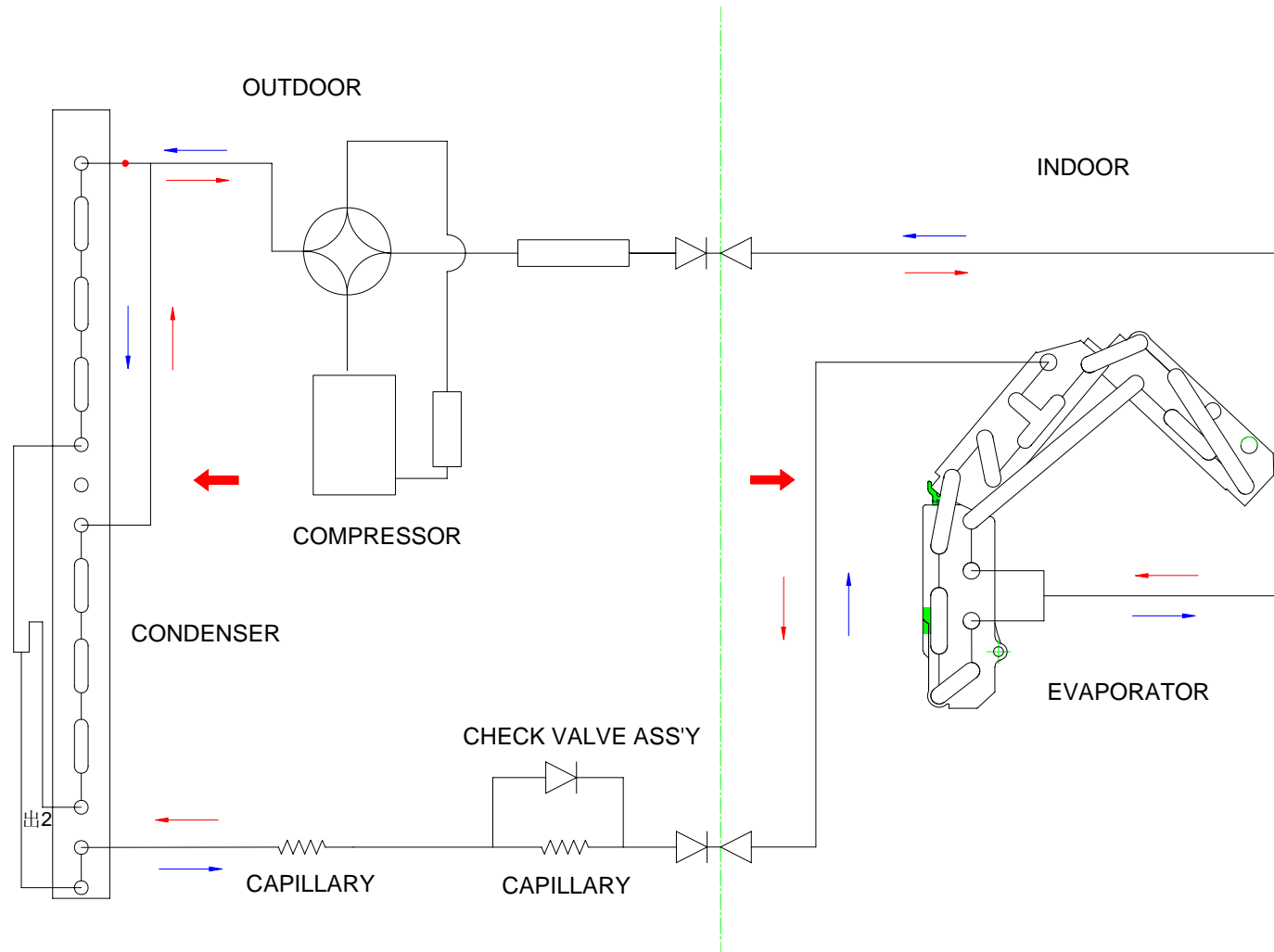
It should remember to avoid installing at places where the natural environment is harsh, such as heavy fumes and wind, direct sunlight or high-temperature and heat, together with the place where children easily reach.

#### 4. The Unit:

When installing the air conditioner, the outdoor unit should be below the indoor unit so as to facilitate circle of refrigerant and refrigeration oil .(1)The height difference between wall mounted indoor unit and the outdoor unit is generally not more than 5 meters. (2)The connection pipe can't exceed 5 meters, and the longest is 15 meters. When the length exceeds 5 meters, 20g fluoride is required to be added for each exceeding 1m.

## 4. REFRIGERANT FLOW DIAGRAM

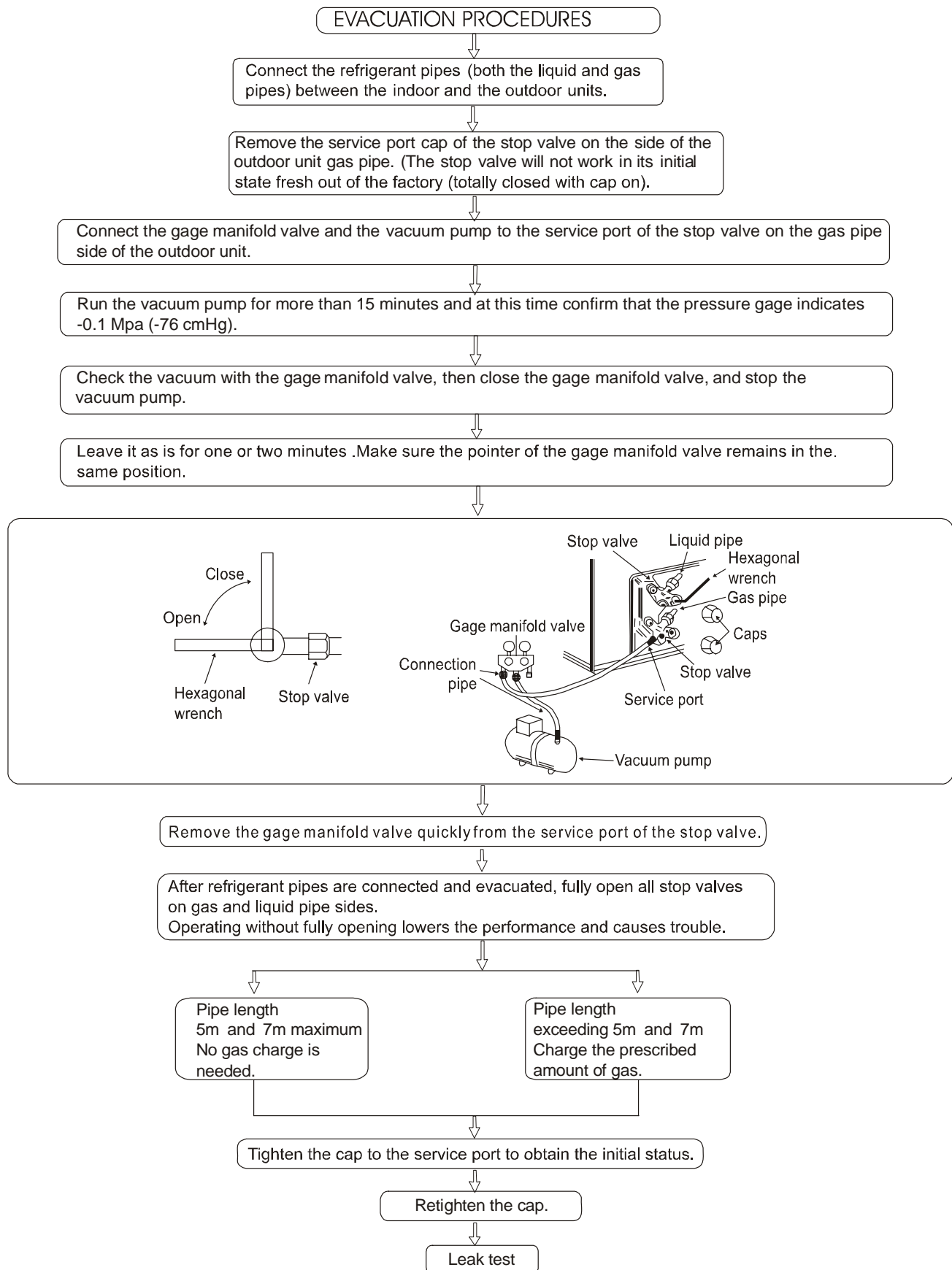
### 4-1. Refrigerant flow diagram :





## 4. REFRIGERANT FLOW DIAGRAM

### 4-2. Evacuation procedures:

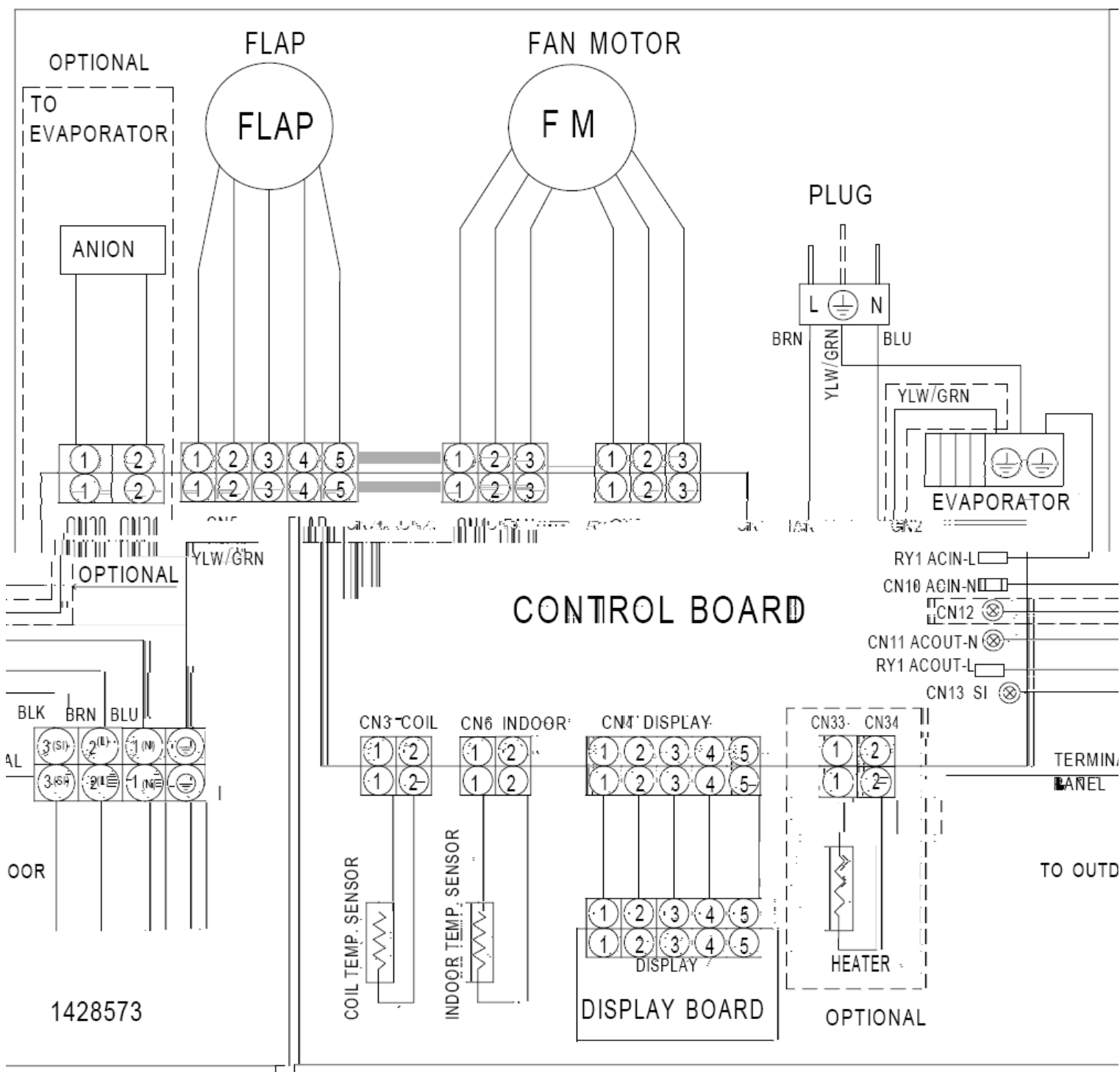


## 5. ELECTRICAL DATA

### 5-1. Electrical wiring diagrams

INDOOR:

(1) AS-09UR4SVNVG1、AS-12UR4SVNVG1 (indoor) :

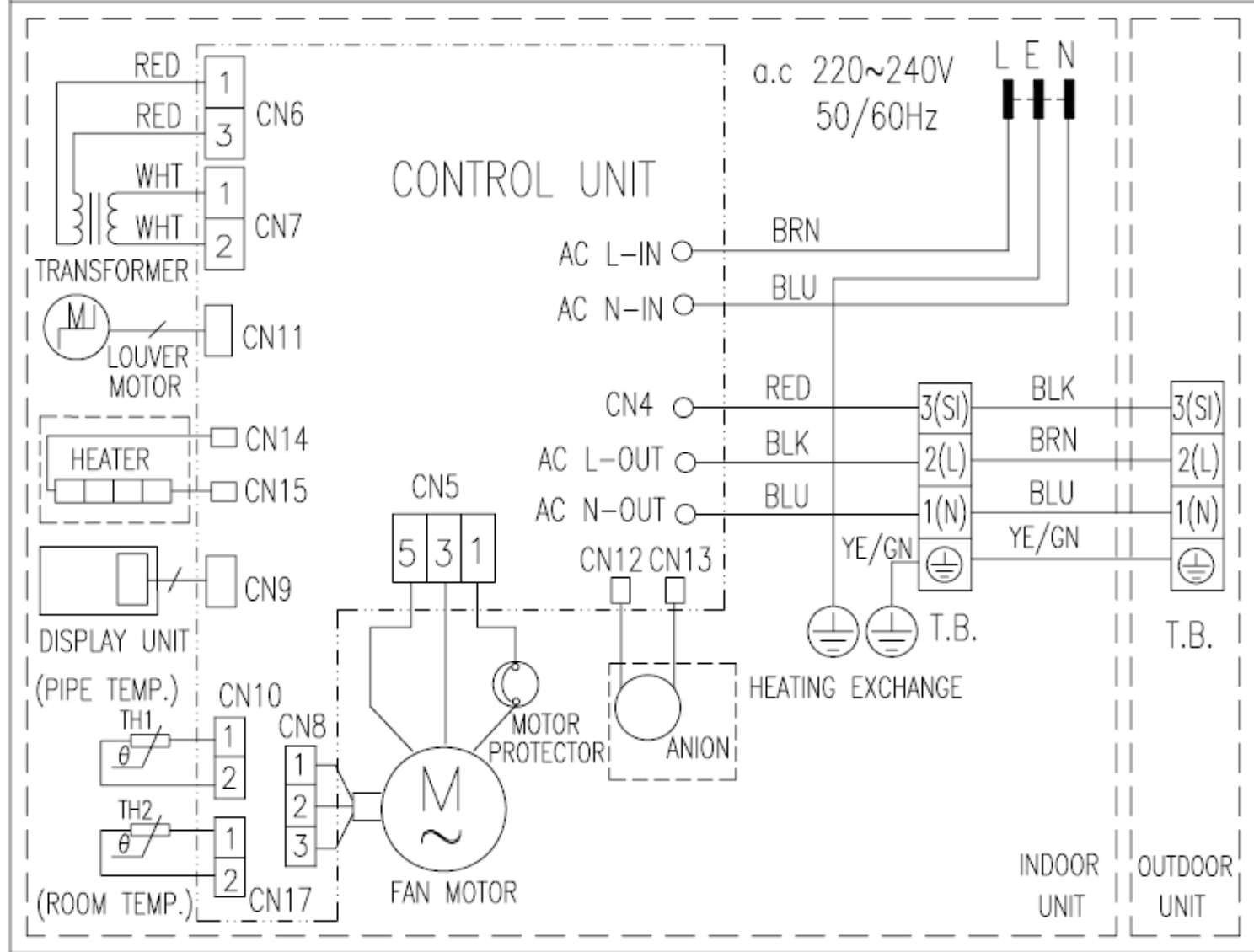


## 5. ELECTRICAL DATA

(2) AS-12UR4SVGVG (indoor) :

### CIRCUIT DIAGRAM

1416818

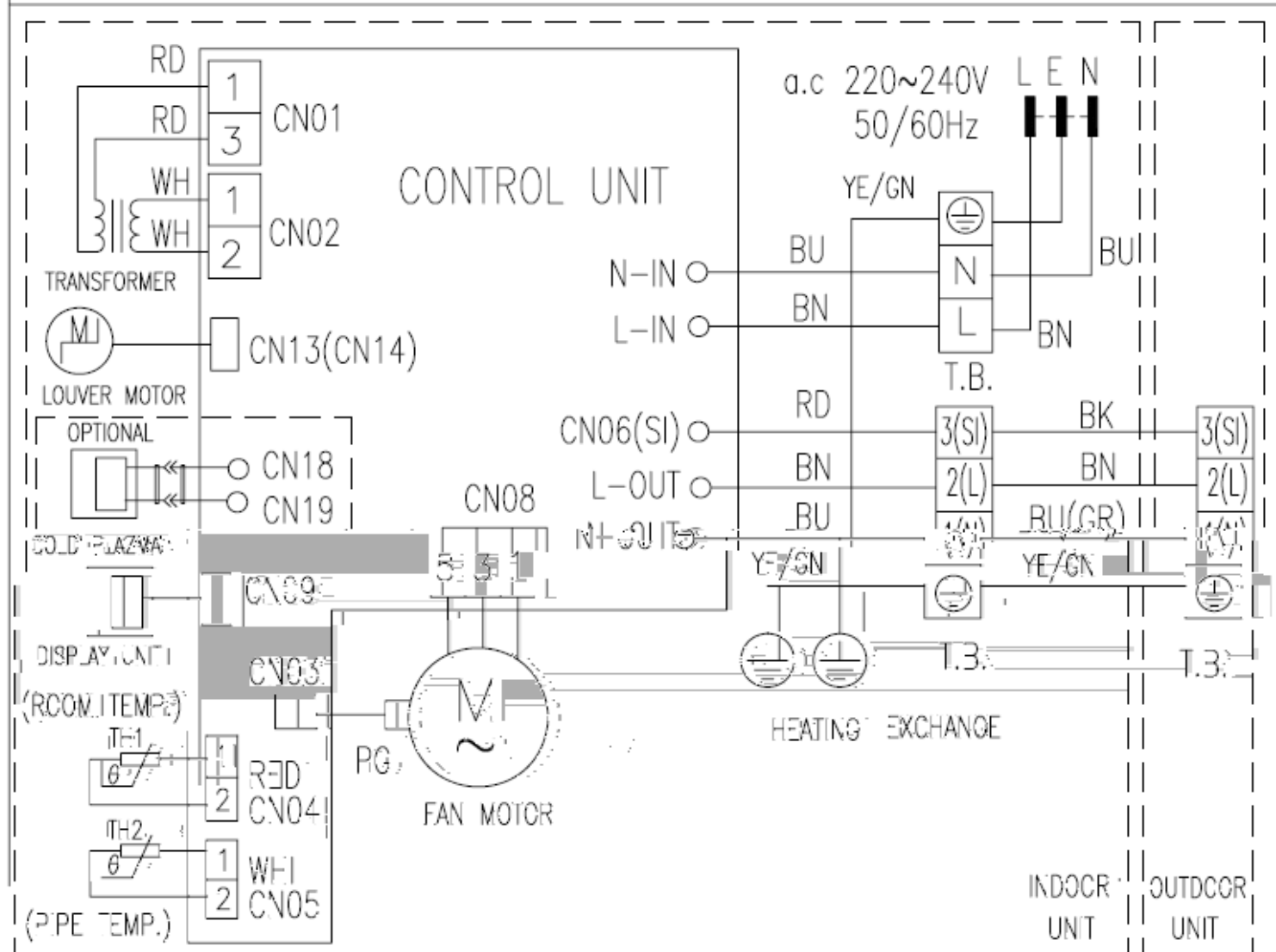


## 5. ELECTRICAL DATA

(3) AS-18UR4STVVG (indoor) :

### CIRCUIT DIAGRAM

1364549

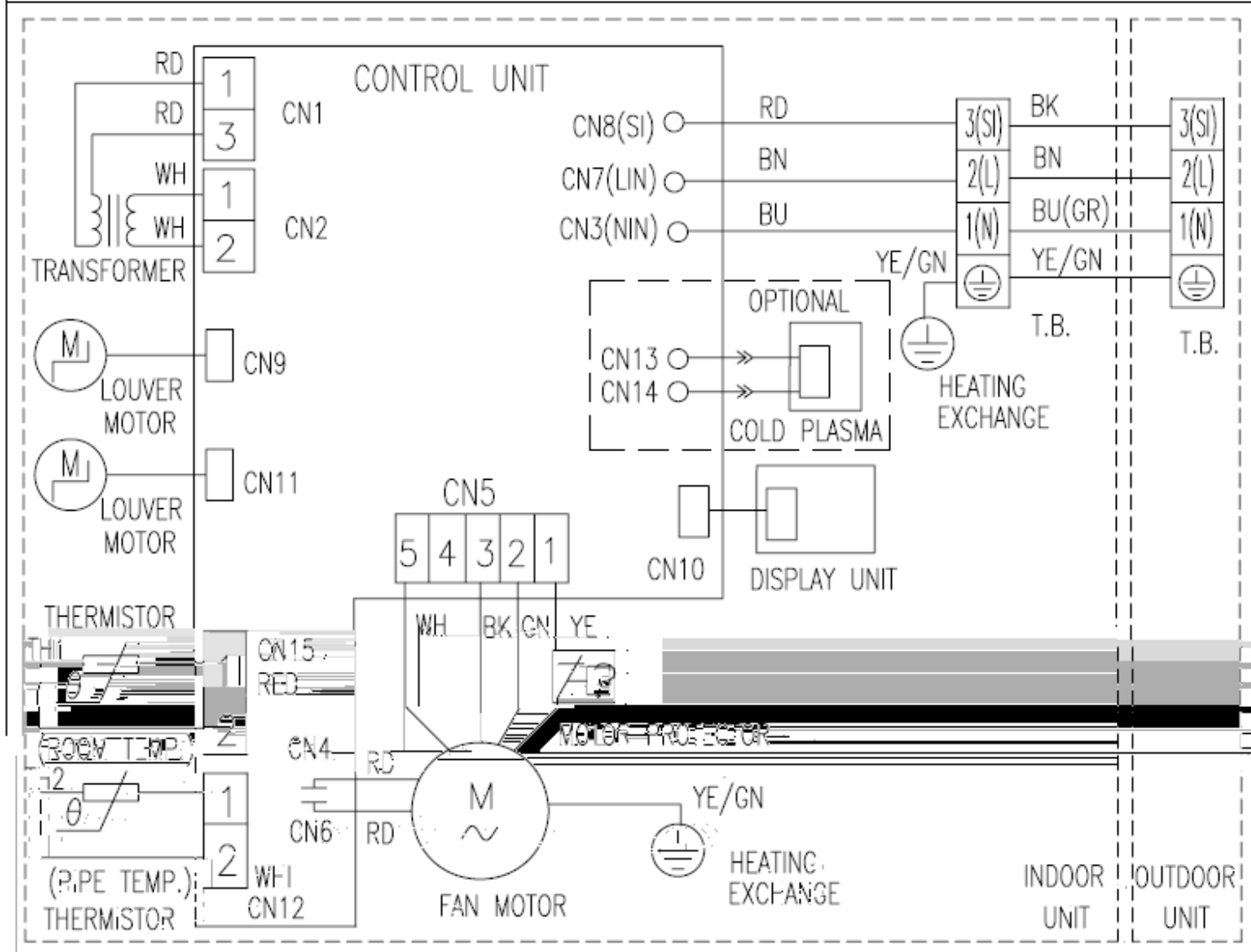


## 5. ELECTRICAL DATA

(4) AS-24UR4SQJVG (indoor)

### CIRCUIT DIAGRAM

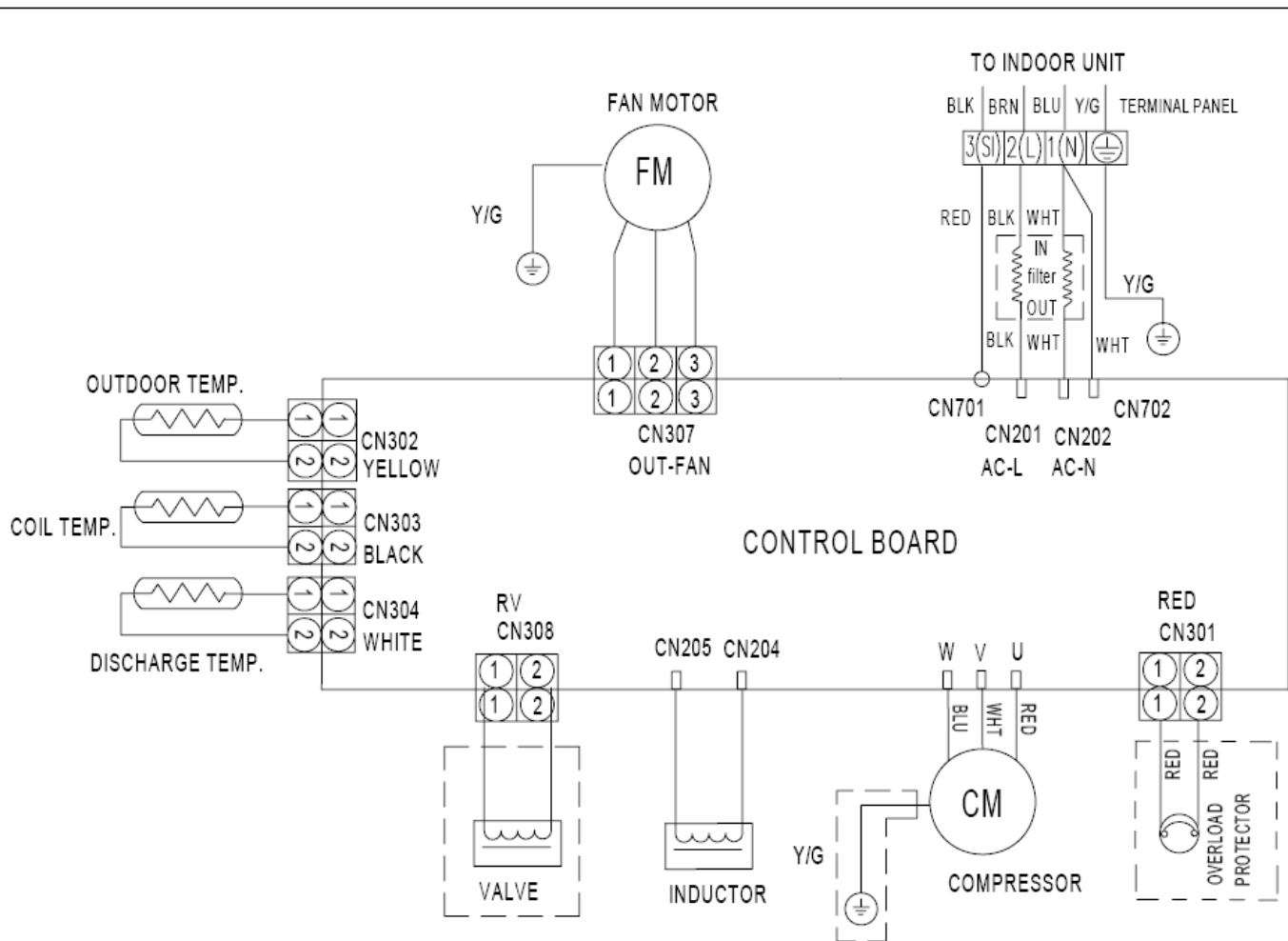
1351963



## 5. ELECTRICAL DATA

### OUTDOOR

(5) AS-09UR4SVNVG1、AS-12UR4SVNVG1、AS-12UR4SVGVG (outdoor)



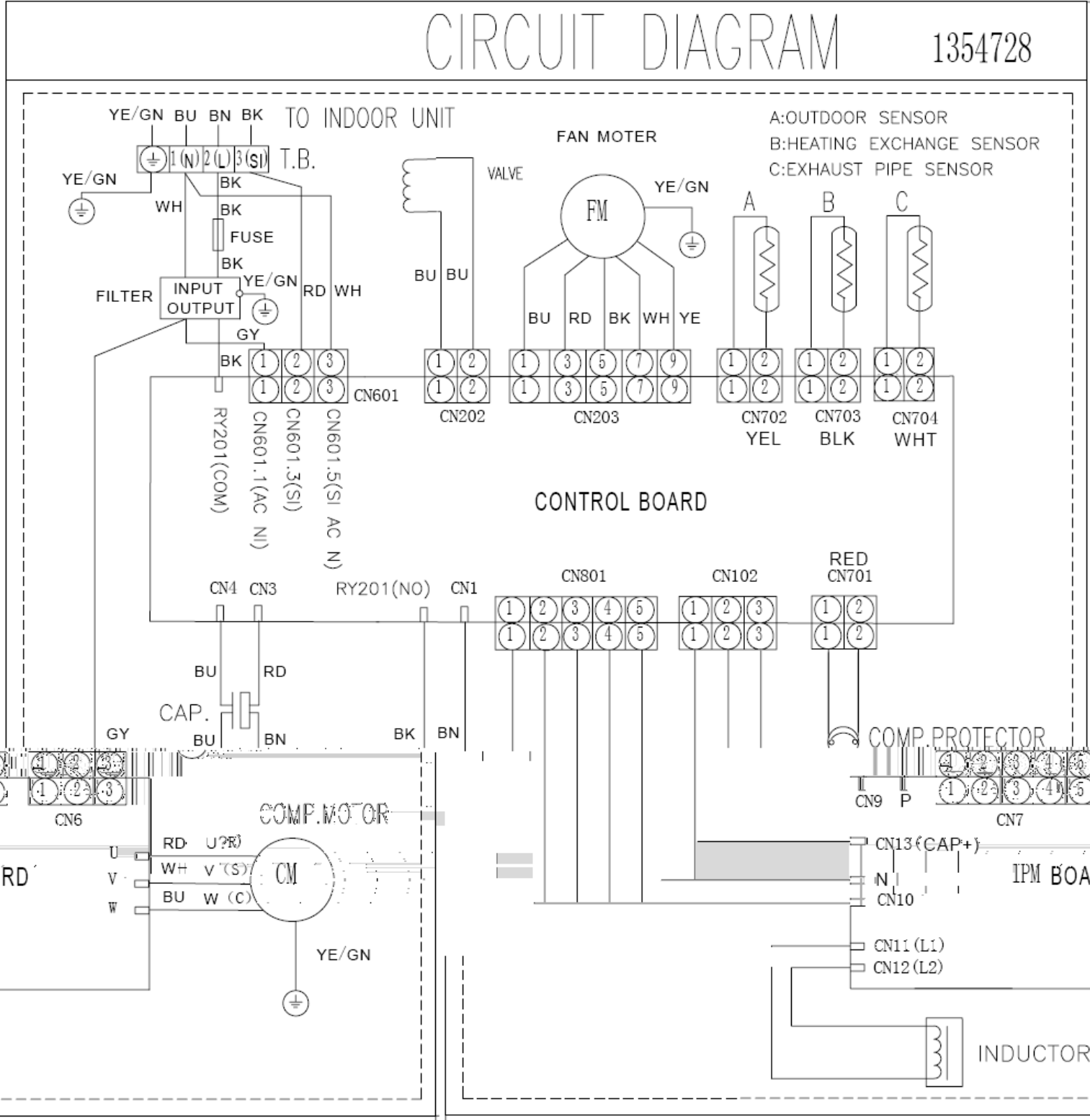
### WARNING

There are electrolytic capacitor with high voltage energy on the PCB, the air conditioner should not be repaired until the capacitor has finished discharge. Multimeter can be used to test the voltage between + and -, when the voltage is zero, the capacitor has finished discharge.

1416821,B

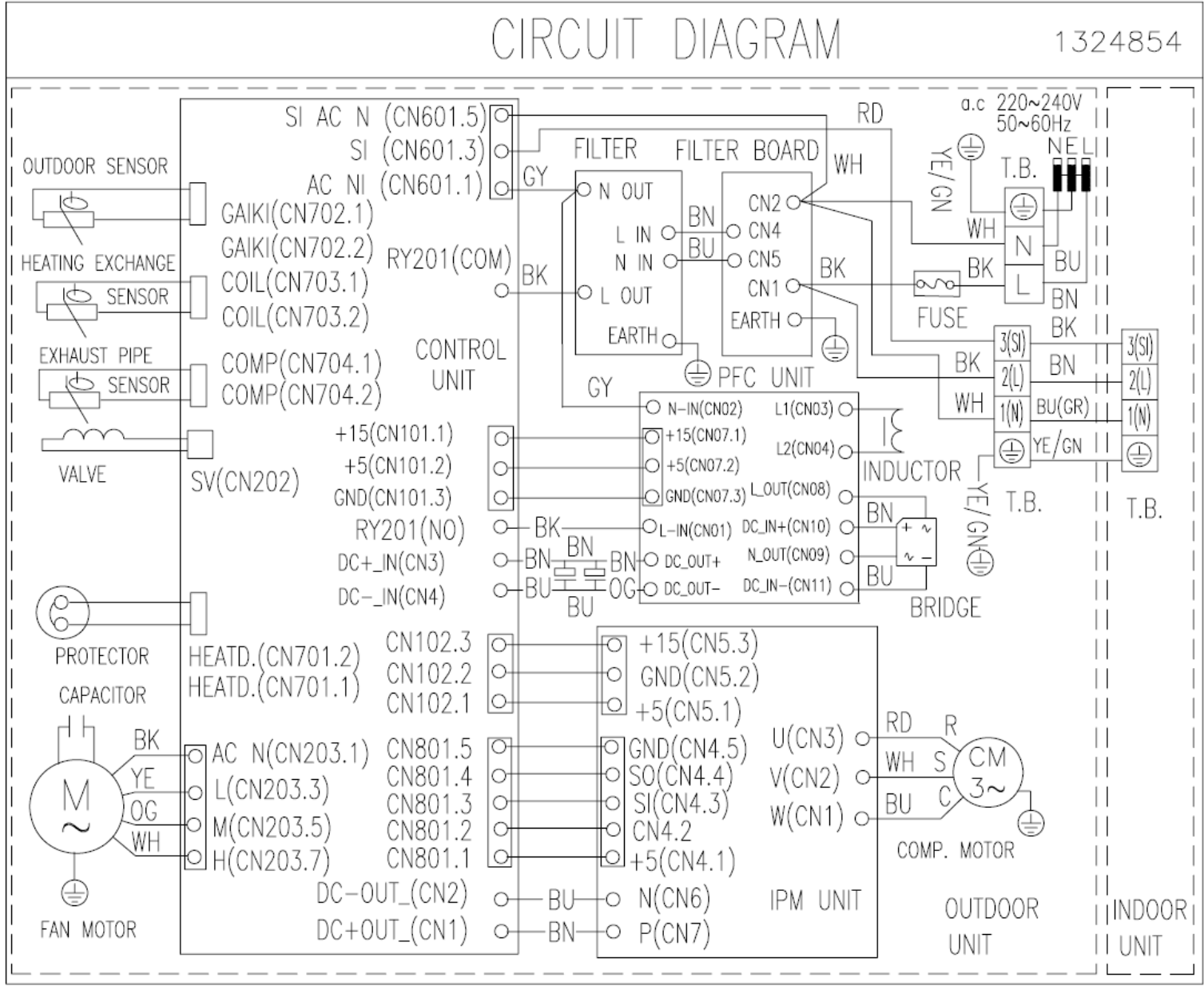
5. ELECTRICAL DATA

(6) AS-18UR4STVVG (outdoor) :



5. ELECTRICAL DATA

(7) AS-24UR4SQJVG (outdoor)





5. ELECTRICAL DATA

5-2. Sensor parameter

1. THE PARAMETER OF OUTDOOR COMPRESSOR TEMPERATURE SENSOR:

(R<sub>0</sub>=187.25K±6.3%; R<sub>100</sub>=3.77K±2.5K; B=3979±1%)

T(℃)	R(KΩ)	V(v)	DEC	HEX	T(℃)	R(KΩ)	V(v)	DEC	HEX	T(℃)	R(KΩ)	V(v)	DEC	HEX
-30	966.1	0.1014	5	5	26	55.46	1.3252	68	44	82	6.662	3.7507	191	BF
-29	910.3	0.1075	5	5	27	53.11	1.3678	70	46	83	6.446	3.7813	193	C1
-28	858	0.1139	6	6	28	50.86	1.4112	72	48	84	6.239	3.8111	194	C2
-27	809	0.1206	6	6	29	48.72	1.4552	74	4A	85	6.039	3.8404	196	C4
-26	763.1	0.1277	7	7	30	46.68	1.4997	76	4C	86	5.846	3.8691	197	C5
-25	720	0.1351	7	7	31	44.74	1.5446	79	4F	87	5.661	3.8970	199	C7
-24	679.6	0.1429	7	7	32	42.89	1.5901	81	51	88	5.482	3.9243	200	C8
-23	641.7	0.1511	8	8	33	41.13	1.6359	83	53	89	5.309	3.9512	202	CA
-22	606.1	0.1597	8	8	34	39.44	1.6824	86	56	90	5.143	3.9773	203	CB
-21	572.7	0.1687	9	9	35	37.84	1.7289	88	58	91	4.982	4.0029	204	CC
-20	541.3	0.1782	9	9	36	36.3	1.7762	91	5B	92	4.827	4.0279	205	CD
-19	511.7	0.1881	10	A	37	34.84	1.8235	93	5E	93	4.678	4.0522	207	CF
-18	484	0.1984	10	A	38	33.44	1.8713	95	5F	94	4.534	4.0760	208	D0
-17	457.9	0.2092	11	B	39	32.11	1.9190	98	62	95	4.395	4.0992	209	D1
-16	433.3	0.2206	11	B	40	30.83	1.9673	100	64	96	4.261	4.1218	210	D2
-15	410.2	0.2325	12	C	41	29.61	2.0157	103	67	97	4.132	4.1439	211	D3
-14	388.5	0.2448	12	C	42	28.45	2.0640	105	69	98	4.007	4.1655	212	D4
-13	368	0.2577	13	D	43	27.34	2.1124	108	6C	99	3.886	4.1866	214	D6
-12	348.7	0.2712	14	E	44	26.27	2.1612	110	6E	100	3.77	4.2070	215	D7
-11	330.5	0.2853	15	F	45	25.25	2.2099	113	71	101	3.658	4.2269	216	D8
-10	313.4	0.2999	15	F	46	24.28	2.2584	115	73	102	3.549	4.2465	217	D9
-9	297.2	0.3153	16	10	47	23.35	2.3068	118	76	103	3.444	4.2655	218	DA
-8	281.9	0.3312	17	11	48	22.46	2.3552	120	78	104	3.343	4.2839	218	DA
-7	267.5	0.3478	18	12	49	21.6	2.4038	123	7B	105	3.15	4.3197	220	DC
-6	253.9	0.3651	19	13	50	20.79	2.4516	125	7D	106	3.059	4.3367	221	DD
-5	241.1	0.3830	20	14	51	20.01	2.4994	127	7F	107	2.97	4.3535	222	DE
-4	229	0.4016	20	14	52	19.26	2.5471	130	82	108	2.884	4.3699	223	DF
-3	217.6	0.4209	21	15	53	18.54	2.5947	132	84	109	2.802	4.3856	224	E0
-2	206.8	0.4409	22	16	54	17.85	2.6420	135	87	110	2.721	4.4012	224	E0
-1	196.6	0.4617	24	17	55	17.19	2.6889	137	89	111	2.721	4.4012	224	E0
0	186.9	0.4833	25	18	56	16.56	2.7352	139	8B	112	2.644	4.4162	225	E1
1	177.8	0.5056	26	19	57	15.96	2.7809	142	8E	113	2.569	4.4309	226	E2
2	169.2	0.5285	27	1A	58	15.38	2.8265	144	90	114	2.496	4.4452	227	E3
3	161	0.5525	28	1B	59	14.82	2.8719	146	92	115	2.426	4.4591	227	E3
4	153.3	0.5770	29	1C	60	14.29	2.9163	149	95	116	2.358	4.4727	228	E4
5	146	0.6024	31	1E	61	13.78	2.9603	151	97	117	2.292	4.4859	229	E5
6	139	0.6289	32	1F	62	13.28	3.0048	153	99	118	2.228	4.4988	229	E5
7	132.5	0.6557	33	21	63	12.81	3.0479	155	9B	119	2.167	4.5112	230	E6
8	126.3	0.6835	35	23	64	12.36	3.0902	158	9E	120	2.107	4.5235	231	E7
9	120.4	0.7123	36	24	65	11.93	3.1319	160	A0	121	2.049	4.5354	231	E7
10	114.8	0.7418	38	26	66	11.51	3.1736	162	A2	122	2.049	4.5354	231	E7
11	109.5	0.7722	39	27	67	11.11	3.2144	164	A4	123	1.994	4.5467	232	E8
12	104.4	0.8039	41	29	68	10.73	3.2541	166	A6	124	1.887	4.5689	233	E9
13	99.66	0.8357	43	2B	69	10.36	3.2938	168	A8	125	1.836	4.5796	234	EA
14	95.13	0.8686	44	2D	70	10	3.3333	170	AA	126	1.787	4.5899	234	EA
15	90.82	0.9024	46	2C	71	9.659	3.3717	172	AC	127	1.739	4.6000	235	EB
16	86.74	0.9369	48	2E	72	9.331	3.4094	174	AE	128	1.693	4.6098	235	EB
17	82.85	0.9723	50	32	73	9.016	3.4464	176	B0	129	1.649	4.6192	236	EC
18	79.16	1.0085	51	33	74	8.712	3.4829	178	B2	130	1.605	4.6286	236	EC
19	75.65	1.0455	53	35	75	8.421	3.5185	179	B3					
20	72.32	1.0832	55	37	76	8.14	3.5537	181	B5					
21	69.15	1.1217	57	39	77	7.869	3.5882	183	B7					
22	66.13	1.1610	59	3B	78	7.609	3.6220	185	B9					
23	63.27	1.2009	61	3D	79	7.359	3.6551	186	BA					
24	60.54	1.2416	63	3F	80	7.118	3.6876	188	BC					
25	57.94	1.2830	65	41	81	6.885	3.7195	190	BE					

5. ELECTRICAL DATA

2. THE PARAMETER OF THE OUTDOOR COIL AND OUTDOOR SENSOR: (R<sub>0</sub>=15K±2%; B=3450±2%)

T(°C)	R(KΩ)	V(v)	DEC	HEX	T(°C)	R(KΩ)	V(v)	DEC	HEX	T(°C)	R(KΩ)	V(v)	DEC	HEX
-30	67.94	0.3235	16	10	18	6.962	2.0151	103	67	66	1.297	3.9186	200	C8
-29	64.25	0.3408	17	11	19	6.688	2.0636	105	69	67	1.258	3.9443	201	C9
-28	60.79	0.3588	18	12	20	6.427	2.1120	108	6C	68	1.22	3.9696	202	CA
-27	57.53	0.3776	19	13	21	6.178	2.1603	110	6E	69	1.184	3.9939	204	CC
-26	54.48	0.3971	20	14	22	5.939	2.2089	113	71	70	1.149	4.0178	205	CD
-25	51.6	0.4174	21	15	23	5.712	2.2570	115	73	71	1.116	4.0406	206	CE
-24	48.9	0.4384	22	16	24	5.494	2.3053	118	76	72	1.083	4.0636	207	CF
-23	46.35	0.4603	23	17	25	5.286	2.3533	120	78	73	1.051	4.0862	208	D0
-22	43.96	0.4829	25	19	26	5.086	2.4014	122	7A	74	1.021	4.1077	209	D1
-21	41.7	0.5065	26	1A	27	4.896	2.4489	125	7D	75	0.9914	4.1290	211	D3
-20	39.58	0.5307	27	1B	28	4.714	2.4963	127	7F	76	0.963	4.1497	212	D4
-19	37.58	0.5558	28	1C	29	4.539	2.5436	130	82	77	0.9354	4.1701	213	D5
-18	35.69	0.5818	30	1E	30	4.372	2.5904	132	84	78	0.9088	4.1898	214	D6
-17	33.91	0.6087	31	1F	31	4.212	2.6369	134	86	79	0.8831	4.2091	215	D7
-16	32.23	0.6363	32	20	32	4.059	2.6830	137	89	80	0.8582	4.2280	216	D8
-15	30.65	0.6648	34	22	33	3.912	2.7288	139	8B	81	0.8342	4.2463	217	D9
-14	29.15	0.6942	35	23	34	3.772	2.7738	141	8D	82	0.8109	4.2643	217	D9
-13	27.74	0.7244	37	25	35	3.637	2.8188	144	90	83	0.7884	4.2818	218	DA
-12	26.4	0.7556	39	27	36	3.508	2.8631	146	92	84	0.7666	4.2988	219	DB
-11	25.14	0.7875	40	28	37	3.384	2.9070	148	94	85	0.7455	4.3155	220	DC
-10	23.95	0.8202	42	2A	38	3.265	2.9504	150	96	86	0.725	4.3318	221	DD
-9	22.82	0.8539	44	2C	39	3.151	2.9932	153	99	87	0.7053	4.3476	222	DE
-8	21.75	0.8885	45	2D	40	3.041	3.0358	155	9B	88	0.6861	4.3631	223	DF
-7	20.74	0.9237	47	2F	41	2.936	3.0775	157	9D	89	0.6676	4.3781	223	DF
-6	19.79	0.9596	49	31	42	2.835	3.1188	159	9F	90	0.6496	4.3929	224	E0
-5	18.88	0.9966	51	33	43	2.739	3.1590	161	A1	91	0.6323	4.4071	225	E1
-4	18.02	1.0343	53	35	44	2.646	3.1990	163	A3	92	0.6156	4.4209	225	E1
-3	17.2	1.0731	55	37	45	2.556	3.2387	165	A5	93	0.5993	4.4345	226	E2
-2	16.43	1.1122	57	39	46	2.471	3.2771	167	A7	94	0.5836	4.4477	227	E3
-1	15.7	1.1520	59	3B	47	2.388	3.3155	169	A9	95	0.5683	4.4606	227	E3
0	15	1.1929	61	3D	48	2.309	3.3528	171	AB	96	0.5535	4.4732	228	E4
1	14.34	1.2342	63	3F	49	2.233	3.3896	173	AD	97	0.5391	4.4855	229	E5
2	13.71	1.2765	65	41	50	2.159	3.4262	175	AF	98	0.5251	4.4975	229	E5
3	13.11	1.3195	67	43	51	2.089	3.4615	177	B1	99	0.5115	4.5093	230	E6
4	12.55	1.3623	69	45	52	2.021	3.4965	178	B2	100	0.4983	4.5207	231	E7
5	12.01	1.4063	72	48	53	1.956	3.5306	180	B4	101	0.4855	4.5319	231	E7
6	11.5	1.4506	74	4A	54	1.893	3.5644	182	B6	102	0.4731	4.5427	232	E8
7	11.01	1.4959	76	4C	55	1.832	3.5977	183	B7	103	0.461	4.5534	232	E8
8	10.55	1.5410	79	4F	56	1.774	3.6299	185	B9	104	0.4492	4.5638	233	E9
9	10.1	1.5878	81	51	57	1.718	3.6616	187	BB	105	0.4378	4.5739	233	E9
10	9.684	1.6338	83	53	58	1.664	3.6926	188	BC	106	0.4268	4.5838	234	EA
11	9.284	1.6805	86	56	59	1.612	3.7231	190	BE	107	0.416	4.5934	234	EA
12	8.903	1.7276	88	58	60	1.562	3.7528	191	BF	108	0.4055	4.6029	235	EB
13	8.54	1.7749	91	5B	61	1.513	3.7824	193	C1	109	0.3953	4.6121	235	EB
14	8.194	1.8226	93	5D	62	1.467	3.8106	194	C2	110	0.3854	4.6211	236	EC
15	7.864	1.8704	95	5F	63	1.422	3.8386	196	C4					
16	7.549	1.9185	98	62	64	1.379	3.8658	197	C5					
17	7.249	1.9667	100	64	65	1.337	3.8927	199	C7					

## 5. ELECTRICAL DATA

### 3.THE PARAMETER OF THE INDOOR COIL AND INDOOR ROOM SENSOR:

( $R_0=15K$ ;  $B=3450$ )

T(°C)	R (KΩ)	V(V)	AD
-20	38.32	0.5469	112
-19	36.47	0.5713	117
-18	34.72	0.5957	122
-17	33.06	0.6201	127
-16	31.49	0.6494	133
-15	30	0.6787	139
-14	28.59	0.708	145
-13	27.26	0.7373	151
-12	25.99	0.7666	157
-11	24.79	0.7959	163
-10	23.65	0.8301	170
-9	22.57	0.8594	176
-8	21.55	0.8936	183
-7	20.57	0.9277	190
-6	19.65	0.9668	198
-5	18.77	1.001	205
-4	17.94	1.04	213
-3	17.15	1.0742	220
-2	16.4	1.1133	228
-1	15.68	1.1523	236
0	15	1.1914	244
1	14.35	1.2354	253
2	13.74	1.2744	261
3	13.15	1.3184	270
4	12.59	1.3574	278
5	12.06	1.4014	287
6	11.56	1.4453	296
7	11.07	1.4893	305
8	10.62	1.5332	314
9	10.18	1.5771	323
10	9.761	1.626	333
11	9.363	1.6699	342
12	8.984	1.7188	352
13	8.622	1.7627	361

T(°C)	R (KΩ)	V(V)	AD
14	8.276	1.8115	371
15	7.946	1.8604	381
16	7.632	1.9043	390
17	7.331	1.9531	400
18	7.044	2.002	410
19	6.769	2.0508	420
20	6.507	2.0947	429
21	6.256	2.1436	439
22	6.017	2.1924	449
23	5.788	2.2412	459
24	5.568	2.29	469
25	5.359	2.334	478
26	5.158	2.3828	488
27	4.966	2.4316	498
28	4.782	2.4805	508
29	4.606	2.5244	517
30	4.437	2.5732	527
31	4.276	2.6172	536
32	4.121	2.666	546
33	3.972	2.71	555
34	3.83	2.7539	564
35	3.694	2.7979	573
36	3.563	2.8418	582
37	3.437	2.8857	591
38	3.317	2.9297	600
39	3.201	2.9736	609
40	3.09	3.0176	618
41	2.984	3.0566	626
42	2.881	3.1006	635
43	2.783	3.1396	643
44	2.689	3.1787	651
45	2.598	3.2178	659
46	2.511	3.2568	667
47	2.427	3.2959	675

T(°C)	R (KΩ)	V(V)	AD
48	2.347	3.335	683
49	2.269	3.374	691
50	2.195	3.4082	698
51	2.126	3.4424	705
52	2.058	3.4766	712
53	1.992	3.5107	719
54	1.928	3.5449	726
55	1.867	3.5791	733
56	1.808	3.6133	740
57	1.751	3.6426	746
58	1.696	3.6719	752
59	1.644	3.7061	759
60	1.593	3.7354	765
61	1.544	3.7646	771
62	1.497	3.7939	777
63	1.451	3.8184	782
64	1.407	3.8477	788
65	1.365	3.877	794
66	1.324	3.9014	799
67	1.284	3.9258	804
68	1.246	3.9502	809
69	1.209	3.9746	814
70	1.174	3.999	819
71	1.133	4.0283	825
72	1.1	4.0527	830
73	1.068	4.0723	834
74	1.037	4.0967	839
75	1.008	4.1162	843
76	0.979	4.1357	847
77	0.951	4.1602	852
78	0.924	4.1797	856
79	0.898	4.1992	860
80	0.873	4.2188	864

## 6. CONTROL MODE

### 6-1. Major general technical parameters

6-1-1 Conditionings for operation: Ambient temperatures: (-15 - +45 °C), relative humidity (45 - 85%).

6-1-2 Remote receiver distance: 8 m.

6-1-3 Remote receiver angle: Less than 80 degrees.

6-1-4 Temperature control accuracy:  $\pm 1^{\circ}\text{C}$ .

6-1-5 Time error: Less than 1%.

6-1-6 The power supply for the air conditioner is a.c 220V, 50Hz, with its fluctuation in the range of (198~264V).

### 6-2. Functions of the controller

#### 6-2-1 Display panel

I. Control functions of the remote controller (See operating and installation manual)

II. Display of the indoor unit

Information on the screen:

#### Displaying Scheme:

**Temperature display:** Display set temperature or indoor temperature, and display fault code in trouble indicating. An error code is displayed according to the signal from the indoor CPU. The error code will flash for 5 seconds while displayed.

**Running indicator:** It is on during operation. It flashes in 10s after the sleep mode has been setted.

**TIMER indicator:** When the timer mode works, the indicator will be lighted.

**Sleep indicator:** When the sleep mode works, the indicator will be lighted.

**Compressor indicator:** It lights up when compressor is running.

**Remote control receiver:** This section receives signals from the remote controller.

### 6-3. Control function

#### 6-3-1 Emergency switch

6-3-1-1 Press the emergency switch once to turn on the machine and press it again to turn off the machine; in the automatic mode, the indoor control temperature is set at 24°C with the indoor fan speed setting is automatic and the flaps sweep.

6-3-1-2 When the machine is turned on (in the OFF condition), press and hold the emergency switch for 5 seconds, the buzzer rings for 3 times and the controller starts in the trial operation. The trial operation is the

## **6. CONTROL MODE**

forced cooling with the indoor fan speed being set at high speeds, the flaps sweeping and the air conditioner's operation is irrelevant with room temperatures.

6-3-1-3 If a remote signal has been received during the emergency run, the machine will operate upon the command of such a remote signal.

### **6-3-2 Operator-machine communication**

6-3-2-1 The air conditioner has a thermal sensor to detect room temperatures. Some remote controller is equipped with a thermal sensor (Such remote controller has the function of man-machine communication. For details, refer to the section for the remote controller). In addition, there is a thermal sensor at the indoor air inlet. In the case where the remote controller is equipped with a thermal sensor, the default setting for room temperatures is subject to the detection by the remote controller. The remote controller detects the room temperature once every 20 seconds, and automatically transmits a signal at an interval of 3 minutes or when a change in the room temperature is detected. 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 thermal sensor on the indoor unit.

6-3-2-2 Neither the turning on nor turning off operation will cancel the operator-machine communication function.

6-3-2-3 In default, the air conditioner is set to start the operator-machine communication function.

### **6-3-3 Timer function**

6-3-3-1 Timer on: When set to start in a time by the remote controller, the air conditioner starts in the timer on condition. When the set time is up, the air conditioner will turn on and operates in the preset conditions after receiving a signal from the remote controller. If the air conditioner

## **6. CONTROL MODE**

has not received a signal from the remote controller when the set time is up, it will automatically start and operate in the preset conditions.

6-3-3-2 Timer off: When set to stop in a set time by the remote controller, the air conditioner will start in the timer off condition. When the set time is up, the air conditioner will turn off after receiving a signal from the remote controller. If the air conditioner has not received a signal from the remote controller when the set time is up, it will turn off automatically.

6-3-3-3 Neither the turning on nor turning off operation will cancel the timer function (Some remote controller has a simple one-hour timer off function and excludes this operation).

### **6-3-4 Sleep**

6-3-4-1 In the heating, cooling or dehumidifying mode, press the "Sleep" button on the remote controller to start or cancel the sleep function in turn, and at the same time the sleep icon on the display screen will be on or off accordingly.

6-3-4-2 According to the different needs, there are four different sleep modes to choose. During the time of sleep mode, the set temperature will change automatically.

6-3-4-3 In default, the setting is to cancel the sleep function. Turning off the unit will also cancel the sleep function.

6-3-4-4 The sleep function is valid for 8 hours. The air conditioner will turn off and cancel the sleep function after the sleep function works for 8 hours.

### **6-3-5 High efficient run function (This function is invalid)**

In the heating (except for the single cooling unit), cooling or dehumidifying mode, it may be set for high efficient run with the indoor fan speed changed to the high efficient fan speed and the compressor operating at the highest frequency as available. If the display screen can display the frequency, the frequency displayed on the screen is up to the maximum. It will restore to the previous run state after 15 minutes

## 6. CONTROL MODE

operation automatically.

### 6-3-6 Automatic run (SMART) mode

If there is no man-machine communication function after the unit is started, the indoor fan operates at the ultra-low flowrate for 20 seconds before selecting a run mode; the room temperatures are detected during this period for the selection of a run mode.

In the first operation:

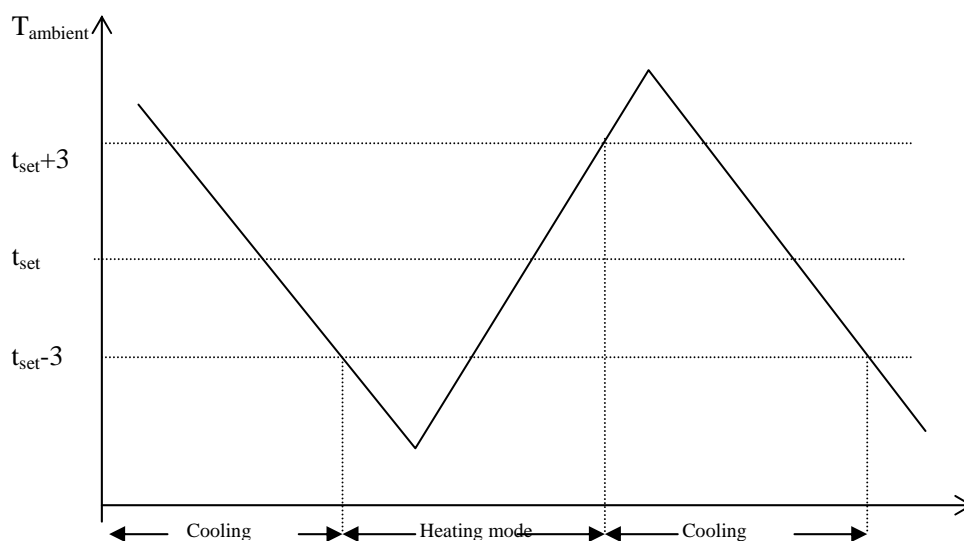
- When  $T_{\text{room}} - T_{\text{set}} > 3^{\circ}\text{C}$ , it starts in the cooling mode;
- When  $-3^{\circ}\text{C} \leq T_{\text{room}} - T_{\text{set}} \leq 3^{\circ}\text{C}$ , it starts in the ventilation run mode;
- When  $T_{\text{room}} - T_{\text{set}} < -3^{\circ}\text{C}$ , it starts in the heating mode.

After the first run in the cooling or heating mode, the mode will be changed as the following:

- When  $T_{\text{room}} - T_{\text{set}} > 3^{\circ}\text{C}$ , it will be changed to the cooling mode;
- When  $T_{\text{room}} - T_{\text{set}} < -3^{\circ}\text{C}$ , it will be changed to the heating mode;
- When these conditions are not met, it will remain in the previous run mode.

When the temperature setting is changed, re-judgment will be made for the run mode according to the descriptions mentioned above; when the compressor is halted for 10 minutes, the re-judgment will be made for the run mode.

#### 6-3-6-1 Switch between the cooling and heating mode:



## 6. CONTROL MODE

### 6-3-6-2 Cooling→heating turnover operation

Cooling→heating: the compressor stops; 50 s later the 4-way valve is activated and 3 minutes more the compressor turns on.

Heating→cooling: the compressor stops, 50 s later the 4-way valve is interrupted and 3 minutes more the compressor turns on.

6-3-6-3 There is temperature compensation during the auto-run, which is same as cooling and heating.

### 6-3-7 Cooling-run mode

#### 5-3-7-1 Temperature compensation

Principle for compensation: The compensation is available only if the proper sensor is used and it is not available when it is subject to the sensor on the remote controller.

#### 6-3-7-2 Outdoor Fan

The outdoor fan's speeds are divided into two levels which can be changed over according to outdoor ambient temperatures.

When operating at a fixed frequency, the outdoor fan is forced to operate at the high speed.

#### 6-3-7-3 Indoor fan

When the fan speed is set at the high, medium and low fan speeds, the fan runs at a preset speed. When the fan speed setting is automatic, the fan speed is set based on the difference in room temperatures.

$T_{\text{room}} - T_{\text{set}}$	Indoor fan speed
$T_{\text{room}} - T_{\text{set}} \leq 2^{\circ}\text{C}$	Low
$2^{\circ}\text{C} < T_{\text{room}} - T_{\text{set}} < 4^{\circ}\text{C}$	Medium
$T_{\text{room}} - T_{\text{set}} \geq 4^{\circ}\text{C}$	High

6-3-7-4 Prevention against condensation and insufficient heat exchange at the low indoor fan speed.

When the indoor fan speed is set at the low fan speed, the compressor's power is restricted as in the low temperature cooling.

#### 6-3-7-5 4-way valve

State: It is interrupted in cooling.

Switchover: When initially powered on for cooling, the 4-way valve is interrupted immediately.

When the heating is changed to the cooling, it needs an interval of 50 seconds for the 4-way valve to change over from being activated to being interrupted.



## 6. CONTROL MODE

### 6-3-8 Heating-run mode

#### 6-3-8-1 Temperature compensation

Principle for compensation: The compensation is available only if the proper sensor is used and it is not available when it is subject to the sensor on the remote controller or line controller.

#### 6-3-8-2 Indoor fan

The fan speed is set at the high, medium or low fan speed, it operates at a preset speed (in the cold air prevention, it is forced to run at the ultra-low flowrate or stop).

When the fan speed is set in the auto-run, the fan speed setting is made according to the room temperature differences (except for the cold air prevention).

$T_{\text{set}} - T_{\text{room}}$	Indoor Fan Speed
$T_{\text{set}} - T_{\text{room}} \leq 2^{\circ}\text{C}$	Low
$2^{\circ}\text{C} < T_{\text{set}} - T_{\text{room}} < 4^{\circ}\text{C}$	Medium
$T_{\text{set}} - T_{\text{room}} \geq 4^{\circ}\text{C}$	High

#### 6-3-8-3 Cold air prevention

In the heating-run, to prevent the indoor fan from blowing cold air, the indoor fan speed is different from the set speed after turning on air-conditioner.

#### 6-3-8-4 Residual heat blowing off

When the compressor is turned off in the heating run, the indoor fan does not stop at once, but until the indoor evaporator temperature is below  $23^{\circ}\text{C}$ , but for 30 seconds at the latest.

#### 6-3-8-5 Outdoor fan

The outdoor fan speeds are divided into three levels which can be changed over according to outdoor ambient temperatures.

#### 6-3-8-6 4-way valve

State: It is electrified in heating.

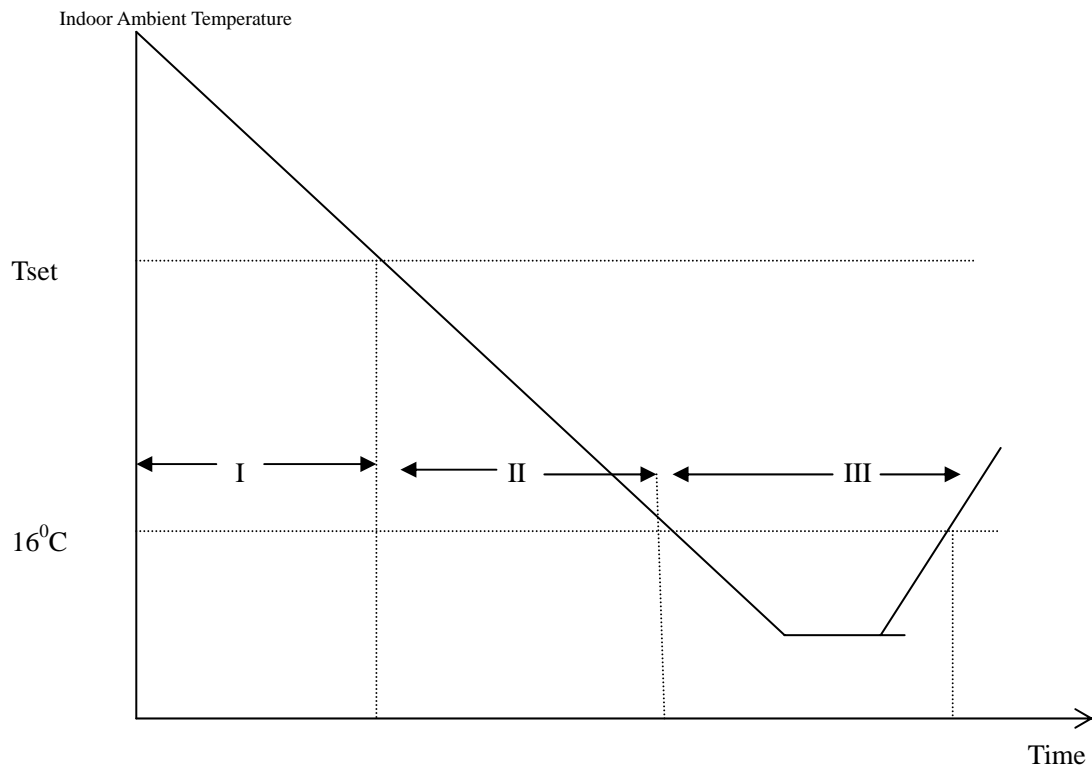
Switchover: When initially powered on for heating, the 4-way valve is activated immediately.

In the change from cooling to heating, it needs an interval of 50 seconds for the 4-way valve to change over from being interrupted to being activated.

## 6. CONTROL MODE

### 6-3-9 Dehumidifying mode

The dehumidifying mode is illustrated as follows:



Dehumidifying area I: Operation at the frequency in the range (30–80 Hz) according to  $\Delta t$  ( $T_{\text{indoor ambient}} - T_{\text{set}}$ ).

$\Delta t(^{\circ}\text{C})$	$f(\text{Hz})$
0	30
0.5	30
1	40
1.5	50
$\geq 2$	60
Efficient	80

Dehumidifying area II: The compressor stops for 5 minutes and operators for 5 minutes at the lowest frequency.

Dehumidifying area III: The compressor stops.

### 6-3-10 Air Blowing mode

The outdoor unit does not work while the indoor fan runs with the fan speed selectable at the auto, low, medium and high speeds.

## 6. CONTROL MODE

When being auto, the fan speed is determined in the cooling mode (with the temperature setting of 24°C in default).

The high, medium and low fan speeds are same with that in the cooling mode.

### 6-3-11 Compressor operating state indication

When the compressor is in operation, The 3 LED indicator lights on the control panel of the outdoor unit indicates the causes of the restriction on the compressor's current operating frequency.

Symbols for indicator light:: ★: ON    ○: flashing    ×: OFF				
	LED1	LED2	LED3	The cause of the restriction on the compressor's current operating frequency
1	○	○	○	Normal frequency ascent and descent with no restriction on the frequency
2	×	×	★	Frequency descent or restriction on frequency ascent caused by over current
3	×	★	★	Frequency descent or restriction on frequency ascent caused by anti-freeze in cooling or overload control in heating
4	★	×	★	Frequency descent or restriction on frequency ascent caused by too high compressor discharge temperature
5	×	★	×	Restriction on maximum operation operating frequency caused by too low voltage on the supply circuit
6	★	★	★	Operating at a fixed frequency (when in a capacity measurement or forced operation at a fixed frequency.)
8	★	×	×	Communication frequency drops.

### 6-3-12 Special notes

6-3-12-1 The outdoor unit of this model is electrified by the indoor unit control. After the system starts to operate, the indoor unit supplies the outdoor unit (except for the ventilation mode). If the EEPROM data is read correctly after turning on the power, the indoor unit's beeper rings one time, or if it is not the case the beeper will ring two times and the

## **6. CONTROL MODE**

system cannot be started. Normally, when the indoor unit receives a control signal from the remote controller and emergency button, the system will be started and the beeper will ring two times, and in other cases, the beeper will ring one time.

6-3-12-2 This model can achieve the power interruption restoration function by the selection of the EEPROM data. The power interruption restoration is applied only for the basic functions (turning ON and OFF, setting temperatures, modes, fan speeds and flap's position) and not for other special functions such as sleep, timing and power-saving run.

## 7 TROUBLE SHOOTING

### 7-1. Trouble alarm

#### Trouble List

##### Indication on the outdoor unit

When the compressor is interrupted, the outdoor LEDs are used to indicate the troubles listed below:

Symbols for indicator lights: ★: ON    0: flashing    ×: OFF				
	LED1	LED2	LED3	Troubles
1	×	×	×	Normal
2	×	×	★	Unused
3	×	★	×	Outdoor heat exchanger temperature sensor be protected
4	★	×	×	Compressor temperature sensor short-circuited, open circuited or the corresponding test circuit in trouble
5	★	×	★	Outdoor heat exchanger temperature sensor short-circuited, open circuited or the corresponding test circuit in trouble
6	★	★	×	Outdoor atmosphere temperature sensor short-circuited, open circuited or the corresponding test circuit in trouble
9	×	×	0	Signal communication abnormal (indoor – outdoor)
10	×	0	×	Power module (IPM) protection
11	★	0	★	Maximum current control
12	★	0	×	Current overload control
13	×	0	★	Compressor discharge temperature too high
14	★	★	0	Over and under-voltage control
18	×	★	0	Compressor housing temperature too high
19	★	★	★	Outdoor memory in trouble
20	×	0	0	Indoor heat exchanger temperature sensor be protected
22	0	0	×	DC compressor fails to start
23	0	×	0	DC compressor out of step

## 7 TROUBLE SHOOTING

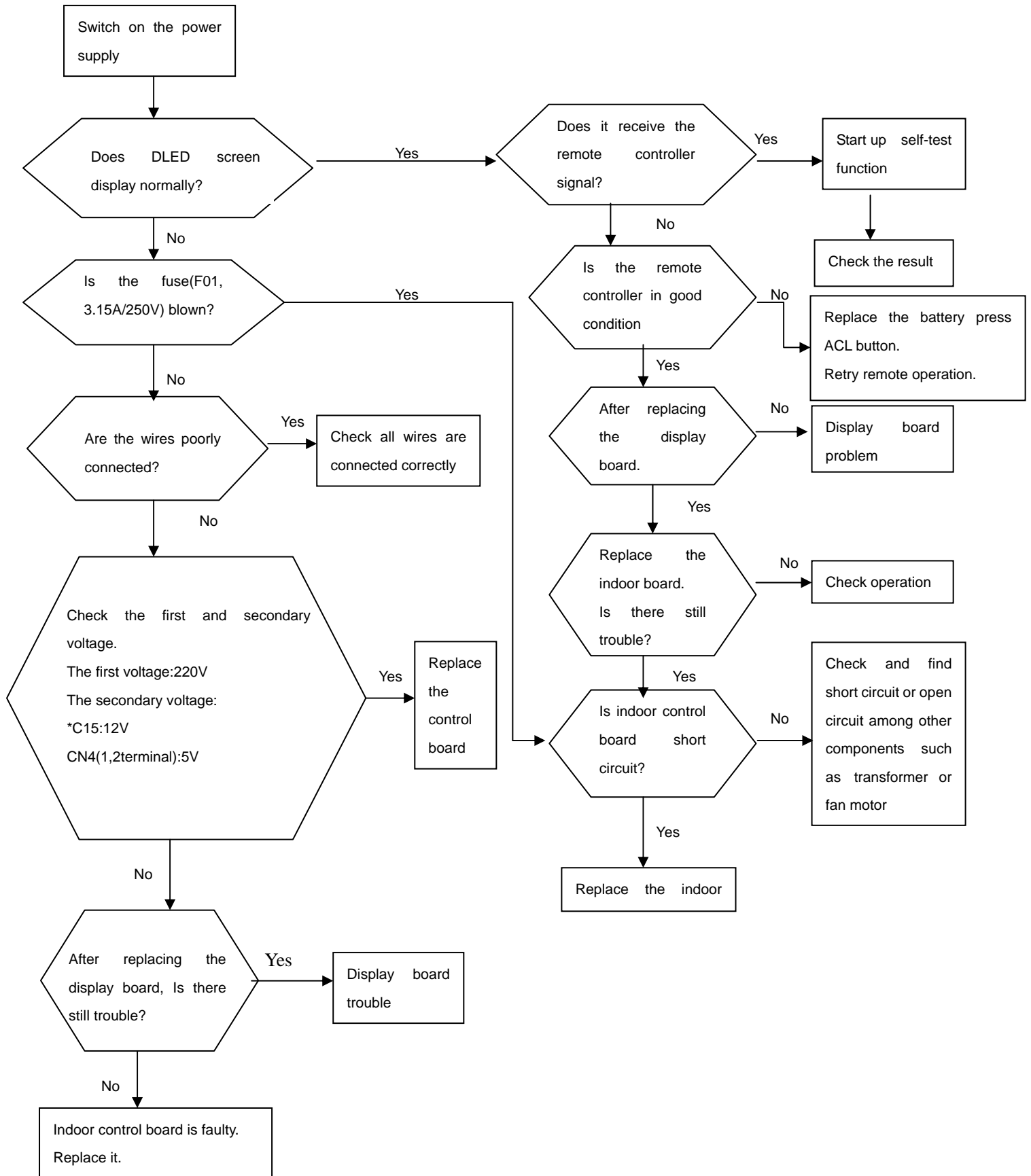
### Indication by the indoor unit

Press the high power for 4 times in a row and the trouble codes listed below will be displayed.

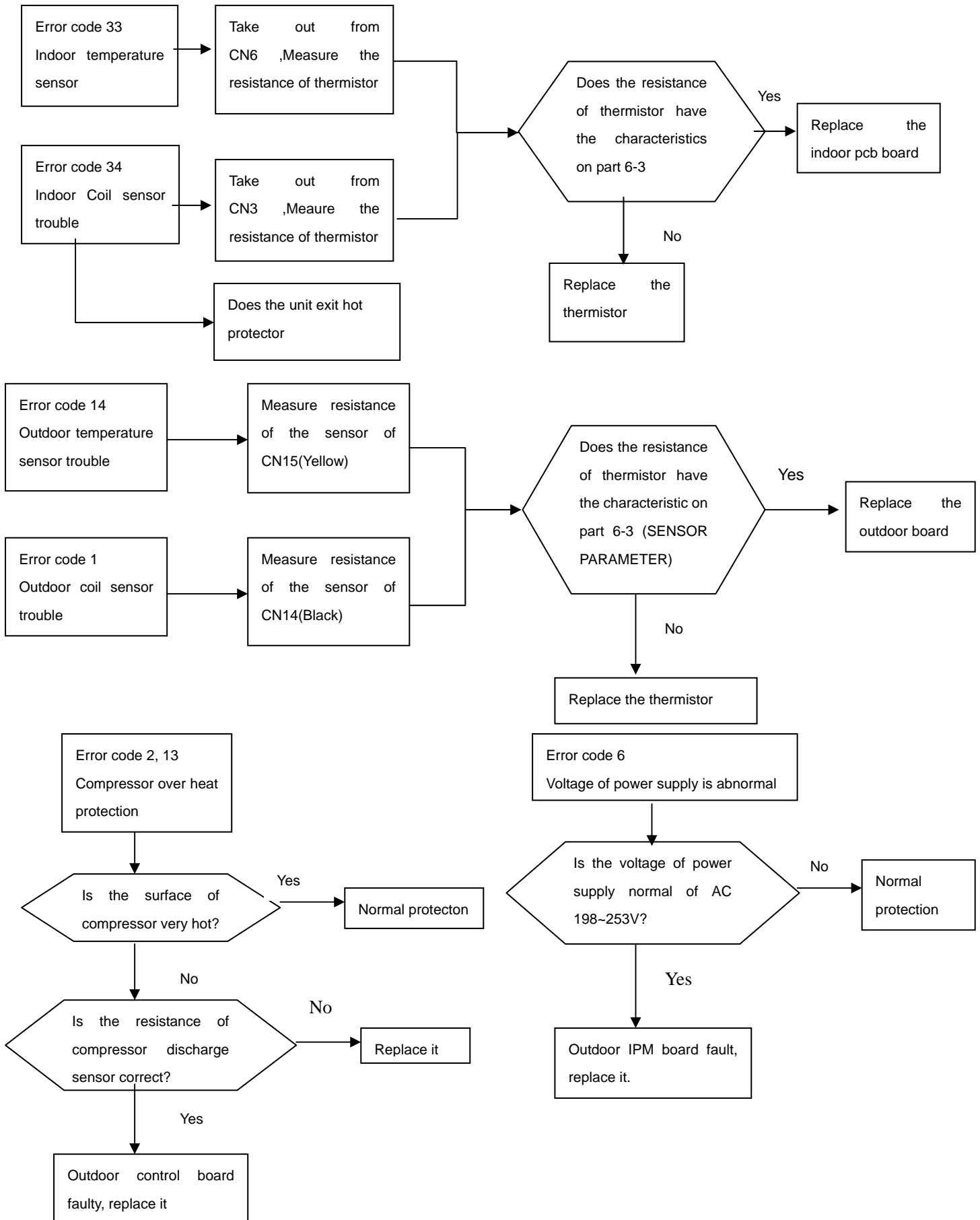
0	No trouble	16	Anti-freeze or overload control
1	Outdoor coil temperature sensor in trouble	18	DC compressor fails to start
2	Compressor temperature sensor in trouble	19	DC compressor out of step
3	Voltage transformer in trouble		
4	Current transformer in trouble		
5	IPM module protection		
6	Over and under-voltage control	33	Room temperature sensor in trouble
7	Communication trouble	34	Indoor coil temperature sensor in trouble
8	Current overload control	36	Communication between the indoor and outdoor in trouble
9	Maximum current control	39	Indoor fan motor operation abnormal
10	Communication trouble(between outdoor unit and driver unit)	40	Grid protection alarm (cabinet type)
11	Outdoor EEPROM in trouble	41	Detecting failures by zero-crossing
13	Compressor exhaust temperature too high control		
14	Outdoor ambient temperature sensor in trouble		
15	Compressor housing temperature control		

## 7 TROUBLE SHOOTING

### 7-2. Service flow chart

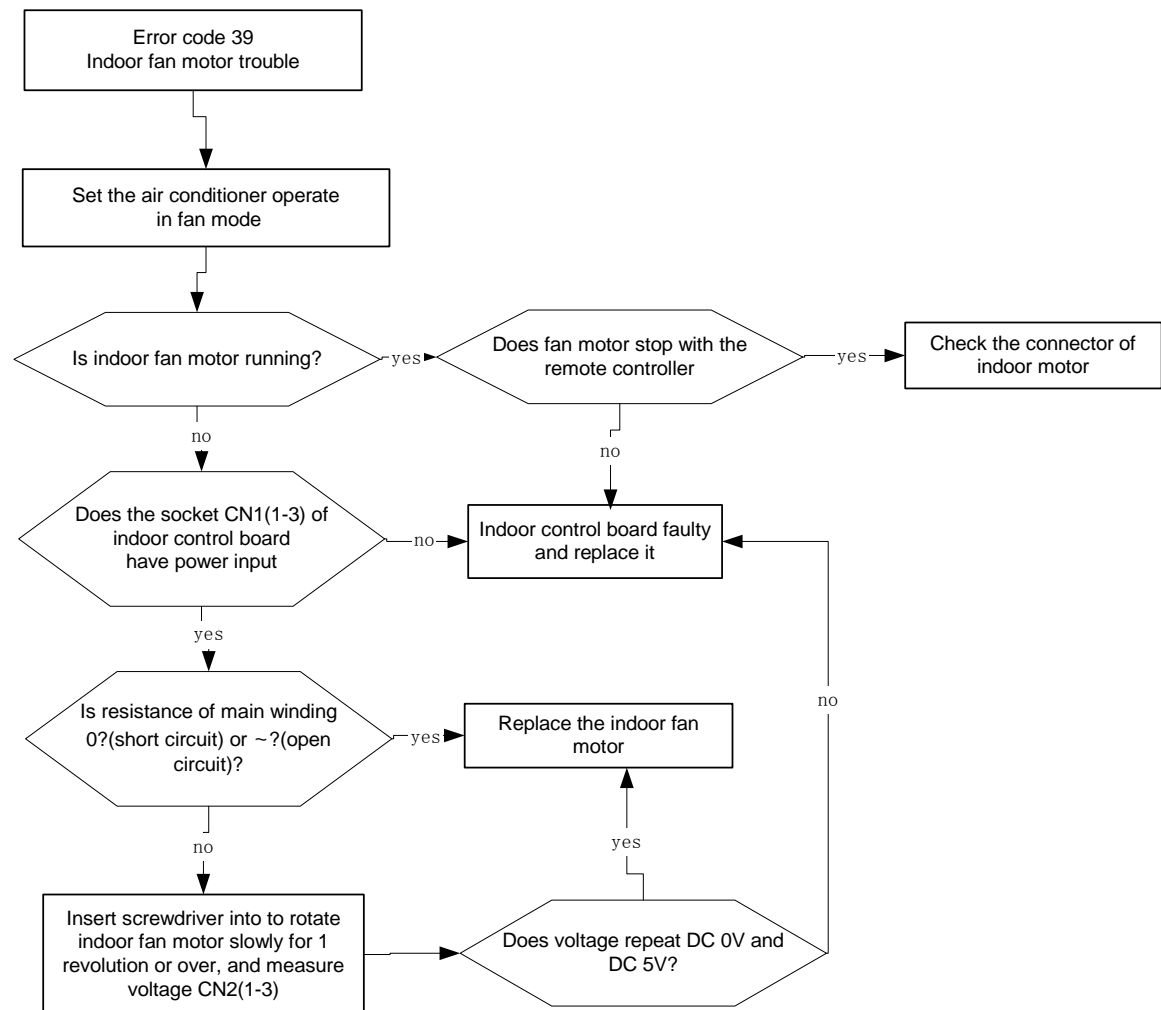


## 7 TROUBLE SHOOTING





## 7. TROUBLE SHOOTING



## 7. TROUBLE SHOOTING

