

climaVAIR



Technical Dossier

WALL MOUNTED UNITS

VAM 2-050 W₂N

VAM 2-060 W₂N

VAM 2-085 W₃N

VAM 2-110 W₄N

2010

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2- TECHNICAL SPECIFICATIONS

Model		VAM 2-050 W2N	VAM 2-060 W2N	VAM 2-085 W3N	VAM 2-110 W4N	
	Indoor unit 1	VAI 2-025 WNI	VAI 2-025 WNI	VAI 2-025 WNI	VAI 2-025 WNI	
	Indoor unit 2	VAI 2-025 WNI	VAI 2-035 WNI	VAI 2-025 WNI	VAI 2-025 WNI	
	Indoor unit 3	\	\	VAI 2-035 WNI	VAI 2-025 WNI	
	Indoor unit 4	\	\	\	VAI 2-035 WNI	
	Outdoor unit	VAF 2-060 W2NO	VAF 2-060 W2NO	VAF 2-085 W3NO	VAF 2-085 W4NO	
Power supply	V/Ph/Hz					
Cooling capacity		kW	5,20	5,40	8,10	9,10
		BTU	17.747	18.429	27.644	31.056
		Fg/h	4.472	4.644	6.966	7.826
Capacity by Indoor	Indoor 1	kW	2,60	2,42	2,43	2,15
	Indoor 2	kW	2,60	2,98	2,43	2,15
	Indoor 3	kW	/	/	3,24	2,15
	Indoor 4	kW	/	/	/	2,65
Power input		kW	1,62	1,66	2,48	2,78
Power input by Indoor	Indoor 1	kW	0,81	0,74	0,77	0,66
	Indoor 2	kW	0,81	0,92	0,77	0,66
	Indoor 3	kW	/	/	0,94	0,66
	Indoor 4	kW	/	/	/	0,80
Min - Max cooling capacity		kW	2.18 - 6.34	2.27 - 6.53	3.40 - 9.80	3.73 - 11.09
Min - Max cooling power input		kW	0.65 - 1.99	0.66 - 2.04	0.99 - 3.06	1.11 - 3.75
Nominal capacity (UK condit)		kW	5,15	5,35	8,02	9,00
Power input (UK conditions)		kW	1,30	1,33	1,98	2,22
Operating current		A	7,00	7,20	10,80	12,10
EER			3,21	3,25	3,27	3,27
Energy level class			A	A	A	A
Annual consumption		kWh	810	830	1.240	1.390
Heating capacity		kW	6,10	6,25	9,05	10,10
		BTU	20.818	21.330	30.886	34.469
		Kcal/h	5.246	5.375	7.783	8.686
Capacity by Indoor	Indoor 1	kW	3,05	2,82	2,71	2,38
	Indoor 2	kW	3,05	3,43	2,71	2,38
	Indoor 3	kW	/	/	3,63	2,38
	Indoor 4	kW	/	/	/	2,96
Power input		kW	1,67	1,73	2,49	2,78
Power input by Indoor	Indoor 1	kW	0,84	0,78	0,77	0,66
	Indoor 2	kW	0,84	0,95	0,77	0,66
	Indoor 3	kW	/	/	0,95	0,66
	Indoor 4	kW	/	/	/	0,80
Min - Max heating capacity		kW	2.56 - 7.38	2.64 - 7.60	3.8 - 10.95	4.13 - 12.30
Min - Max heating power input		kW	0.67 - 2.06	0.69 - 2.11	1.0 - 3.07	1.11 - 3.72
Nominal capacity (UK condit)		kW	5,19	5,31	7,69	8,57
Power input (UK conditions)		kW	1,45	1,51	2,17	2,42
Operating current		A	7,30	7,50	10,80	12,10
COP			3,65	3,61	3,63	3,63
Energy level class			A	A	A	A
Max power input		kW	2,15	2,15	3,10	4,80
Max operating current		A	10,5	10,5	16,0	21,0

2- TECHNICAL SPECIFICATIONS

INDOOR UNIT		VAM 2-050 W2N	VAM 2-060 W2N	VAM 2-085 W3N	VAM 2-110 W4N
Air flow volume	m ³ /h	250/300/500	250/300/500	250/300/500	250/300/500
	m ³ /h	250/300/500	310/450/580	250/300/500	250/300/500
	m ³ /h	/	/	310/450/580	250/300/500
	m ³ /h	/	/	/	310/450/580
Remote control type		Infrared	Infrared	Infrared	Infrared
Remote control reference		RG19B/E (white)	RG19B/E (white)	RG19B/E (white)	RG19B/E (white)
Sound power level	Indoor 1	dB(A)	40/45/51	40/45/51	40/45/51
	Indoor 2	dB(A)	40/45/51	41/47/52	40/45/51
	Indoor 3	dB(A)	/	/	41/47/52
	Indoor 4	dB(A)			41/47/52
Sound pressure level	Indoor 1	dB(A)	28/33/39	28/33/39	28/33/39
	Indoor 2	dB(A)	28/33/39	29/35/40	28/33/39
	Indoor 3	dB(A)	/	/	29/35/40
	Indoor 4	dB(A)	/	/	29/35/40
Catalogue sound pressure	Indoor 1	dB(A)	26/32/38	26/32/38	26/32/38
	Indoor 2	dB(A)	26/32/38	28/35/40	26/32/38
	Indoor 3	dB(A)	/	/	28/35/40
	Indoor 4	dB(A)			28/35/40
Testing conditions for sound pressure		microphone directivity,distance 1.0m			
Dimensions HxLxD	Indoor 1	mm	265 x 790 x 200	265 x 790 x 200	265 x 790 x 200
	Indoor 2	mm	265 x 790 x 200	265 x 790 x 200	265 x 790 x 200
	Indoor 3	mm	/	/	265 x 790 x 200
	Indoor 4	mm	/	/	265 x 790 x 200
Net weight	Indoor 1	Kg	8.5	8.5	8.5
	Indoor 2	Kg	8.5	8.5	8.5
	Indoor 3	Kg	/	/	8.5
	Indoor 4	Kg	/	/	8.5
Packaged dimensions HxLxD	Indoor 1	mm	335 x 875 x 265	335 x 875 x 265	335 x 875 x 265
	Indoor 2	mm	335 x 875 x 265	335 x 875 x 265	335 x 875 x 265
	Indoor 3	mm	/	/	335 x 875 x 265
	Indoor 4	mm			335 x 875 x 265
Volume	Indoor 1	m ³	0,078	0,078	0,078
	Indoor 2	m ³	0,078	0,078	0,078
	Indoor 3	m ³	/	/	0,078
	Indoor 4	m ³	/	/	0,078
Packaged weight	Indoor 1	Kg	10,5	10,5	10,5
	Indoor 2	Kg	10,5	10,5	10,5
	Indoor 3	Kg	/	/	10,5
	Indoor 4	Kg	/	/	10,5

2- TECHNICAL SPECIFICATIONS

OUTDOOR UNIT		VAM 2-050 W2N	VAM 2-060 W2N	VAM 2-085 W3N	VAM 2-110 W4N
Air flow volume	m ³ /h	2.500	2.500	2.500	3.500
Sound power level	dB(A)	62	62	64	65
Sound pressure	dB(A)	52	52	55	57
Number of fans		1	1	1	1
Refrigerant		R410A			
Refrigerant charge heat pump	gr	1450	1450	2000	2400
Inverter DC / AC		Inverter DC	Inverter DC	Inverter DC	Inverter DC
Number of compressors		1	1	1	1
Compressor type		Rotary	Rotary	Rotary	Rotary
Compressor Model		DA130S1C-20FZ	DA130S1C-20FZ	DA150S1C-20FZ	TNB220FLHMC-L
Compressor Brand		Toshiba	Toshiba	Toshiba	Mitsubishi
Expansion system		EXV + Capillary			
Electric_electronic protections		Voltage,current, communication protection			
Dimensions HxLxD	mm	695 x 845 x 315	695 x 845 x 315	695 x 845 x 315	862 x 895 x 305
Dimensions Valves A/B/C/F	mm	60/60/160/220	60/60/160/220	60/60/160/220	60/60/160/220
Dimensions Installation I/J	mm	335/560	335/560	335/560	330/590
Net weight	Kg	60,0	60,0	62,0	78,0
Packaged dimensions HxLxD	mm	770 x 970 x 400	770 x 970 x 400	770 x 970 x 400	915 x 1043 x 395
Volume		0,299	0,299	0,299	0,377
Packaged weight heat pump	Kg	64,0	64,0	66,0	82,0
INSTALLATION					
Pipe connection liq/gas Outdoor	inches	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"
	inches	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"
	inches	\	\	1/4" - 3/8"	1/4" - 3/8"
	inches	\	\	\	1/4" - 3/8"
Pipe connection liq/gas Indoor	inches	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"
	inches	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"	1/4" - 3/8"
	inches	\	\	1/4" - 3/8"	1/4" - 3/8"
	inches	\	\	\	1/4" - 3/8"
PM (Max pressure)	bar	42	42	42	42
pm (min pressure)	bar	25	25	25	25
Max. L1+L2+(L3)	m	30	30	45	60
Max. L1	m	15	15	15	15
Max. Height IU under OU	m	10	10	10	10
Max. Height OU under IU	m	10	10	10	10
Chargeless length	m	7,5	7,5	7,5	7,5
Additional charge per meter	gr	15	15	15	15

3- TEMPERATURE BY CAPACITIES

3.1 VAM 2-050 W2N

COOLING		OUTDOOR TEMPERATURE DRY						
Indoor Conditions		21°C	25°C	30°C	35°C	40°C	45°C	50°C
21°C D 15°C W	Total capacity kW	5,27	5,10	4,89	4,64	4,41	4,17	3,82
	Sensitive capacity kW	4,22	4,08	3,91	3,71	3,53	3,34	3,05
	Input kW.	1,32	1,34	1,36	1,37	1,40	1,42	1,65
24°C D 17°C W	Total capacity kW	5,61	5,42	5,20	4,94	4,69	4,44	4,06
	Sensitive capacity kW	4,49	4,34	4,16	3,95	3,75	3,55	3,25
	Input kW.	1,45	1,47	1,49	1,51	1,53	1,55	1,81
27°C D 19°C W	Total capacity kW	5,90	5,71	5,47	5,20	4,94	4,67	4,27
	Sensitive capacity kW	4,72	4,57	4,38	4,16	3,95	3,74	3,42
	Input kW.	1,55	1,58	1,60	1,62	1,65	1,67	1,94
32°C D 23°C W	Total capacity kW	6,61	6,39	6,13	5,82	5,53	5,23	4,79
	Sensitive capacity kW	5,29	5,12	4,90	4,66	4,43	4,18	3,83
	Input kW.	1,77	1,79	1,82	1,84	1,87	1,90	2,21

HEATING		OUTDOOR CONDITIONS							
Indoor Conditions		24°C D 18°C W	12°C D 11°C W	7°C D 6°C W"	4°C D 3°C W	0°C D -1°C W	-5°C D -6°C W	-7°C D -8°C W"	-15°C D -16°C W"
15°C	Capacity kW	5,84	7,85	6,71	5,30	4,33	4,06	3,31	1,41
	Input kW.	1,84	2,22	1,80	1,62	1,52	1,51	1,49	1,30
18°C	Capacity kW	5,57	7,49	6,41	5,06	4,14	3,88	3,16	1,35
	Input kW.	1,77	2,13	1,73	1,56	1,46	1,45	1,44	1,26
20°C	Capacity kW	5,31	7,14	6,10	4,82	3,94	3,69	3,01	1,28
	Input kW.	1,70	2,05	1,67	1,50	1,41	1,40	1,38	1,21
22°C	Capacity kW	5,09	6,85	5,86	4,62	3,78	3,55	2,89	1,23
	Input kW.	1,47	1,97	1,69	1,52	1,42	1,41	1,40	1,22
27°C	Capacity kW	4,62	6,21	5,31	4,19	3,43	3,21	2,62	1,11
	Input kW.	1,79	2,16	1,76	1,58	1,48	1,47	1,46	1,27

3- TEMPERATURE BY CAPACITIES

3.2 VAM 2-060 W2N

COOLING		OUTDOOR TEMPERATURE DRY						
Indoor Conditions		21°C	25°C	30°C	35°C	40°C	45°C	50°C
21°C D 15°C W	Total capacity kW	5,47	5,29	5,07	4,82	4,58	4,33	3,96
	Sensitive capacity kW	4,38	4,24	4,06	3,86	3,66	3,46	3,17
	Input kW.	0,64	1,05	1,28	1,56	1,75	1,76	1,78
24°C D 17°C W	Total capacity kW	5,82	5,63	5,40	5,13	4,87	4,61	4,22
	Sensitive capacity kW	4,66	4,51	4,32	4,10	3,90	3,69	3,37
	Input kW.	0,65	1,08	1,32	1,61	1,80	1,82	1,84
27°C D 19°C W	Total capacity kW	6,13	5,93	5,68	5,40	5,13	4,85	4,44
	Sensitive capacity kW	4,90	4,74	4,54	4,32	4,10	3,88	3,55
	Input kW.	0,68	1,12	1,36	1,66	1,86	1,88	1,90
32°C D 23°C W	Total capacity kW	6,86	6,64	6,36	6,05	5,75	5,43	4,97
	Sensitive capacity kW	5,49	5,31	5,09	4,84	4,60	4,34	3,98
	Input kW.	0,75	1,23	1,50	1,83	2,05	2,07	2,09

HEATING		OUTDOOR CONDITIONS							
Indoor Conditions		24°C D 18°C W	12°C D 11°C W	7°C D 6°C W"	4°C D 3°C W	0°C D -1°C W	-5°C D -6°C W	-7°C D -8°C W"	-15°C D -16°C W"
15°C	Capacity kW	6,34	7,10	6,88	5,67	5,33	4,81	4,37	2,06
	Input kW.	0,62	1,29	1,87	1,88	1,68	1,37	1,27	0,96
18°C	Capacity kW	6,05	6,78	6,56	5,41	5,09	4,59	4,17	1,97
	Input kW.	0,59	1,24	1,80	1,81	1,62	1,32	1,23	0,92
20°C	Capacity kW	5,77	6,46	6,25	5,15	4,84	4,38	3,97	1,88
	Input kW.	0,57	1,19	1,73	1,75	1,56	1,27	1,18	0,89
22°C	Capacity kW	5,54	6,20	6,00	4,95	4,65	4,20	3,81	1,80
	Input kW.	0,58	1,21	1,75	1,77	1,57	1,28	1,19	0,90
27°C	Capacity kW	5,02	5,62	5,44	4,48	4,21	3,81	3,45	1,63
	Input kW.	0,58	1,22	1,77	1,79	1,59	1,30	1,21	0,91

3- TEMPERATURE BY CAPACITIES

3.3 VAM 2-085 W3N

COOLING		OUTDOOR TEMPERATURE DRY						
Indoor Conditions		21°C	25°C	30°C	35°C	40°C	45°C	50°C
21°C D 15°C W	Total capacity kW	8,21	7,94	7,61	7,23	6,87	6,50	5,95
	Sensitive capacity kW	6,57	6,35	6,09	5,79	5,50	5,20	4,76
	Input kW.	0,95	1,57	1,91	2,33	2,61	2,63	2,66
24°C D 17°C W	Total capacity kW	8,73	8,45	8,10	7,70	7,31	6,91	6,33
	Sensitive capacity kW	6,99	6,76	6,48	6,16	5,85	5,53	5,06
	Input kW.	0,98	1,62	1,97	2,40	2,69	2,72	2,75
27°C D 19°C W	Total capacity kW	9,19	8,89	8,52	8,10	7,70	7,27	6,66
	Sensitive capacity kW	7,35	7,12	6,82	6,48	6,16	5,82	5,33
	Input kW.	1,01	1,67	2,03	2,48	2,78	2,80	2,83
32°C D 23°C W	Total capacity kW	10,30	9,96	9,54	9,07	8,62	8,15	7,46
	Sensitive capacity kW	8,24	7,97	7,63	7,26	6,89	6,52	5,97
	Input kW.	1,11	1,84	2,24	2,74	3,06	3,09	3,13

HEATING		OUTDOOR CONDITIONS							
Indoor Conditions		24°C D 18°C W	12°C D 11°C W	7°C D 6°C W"	4°C D 3°C W	0°C D -1°C W	-5°C D -6°C W	-7°C D -8°C W"	-15°C D -16°C W"
15°C	Capacity kW	9,18	10,29	9,96	8,21	7,71	6,97	6,32	2,99
	Input kW.	0,89	1,85	2,69	2,71	2,42	1,97	1,83	1,38
18°C	Capacity kW	8,77	9,82	9,50	7,84	7,36	6,65	6,03	2,85
	Input kW.	0,85	1,78	2,59	2,61	2,33	1,90	1,77	1,33
20°C	Capacity kW	8,35	9,35	9,05	7,46	7,01	6,34	5,75	2,72
	Input kW.	0,82	1,72	2,49	2,51	2,24	1,83	1,70	1,28
22°C	Capacity kW	8,01	8,98	8,69	7,16	6,73	6,08	5,52	2,61
	Input kW.	0,83	1,74	2,52	2,54	2,26	1,85	1,72	1,29
27°C	Capacity kW	7,26	8,13	7,87	6,49	6,10	5,51	5,00	2,36
	Input kW.	0,84	1,76	2,55	2,57	2,29	1,87	1,74	1,31

3- TEMPERATURE BY CAPACITIES

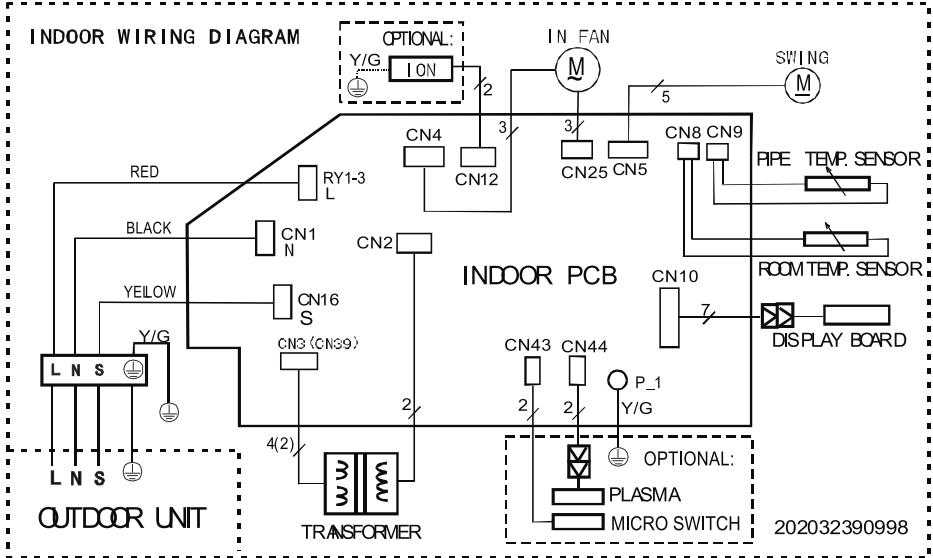
3.4 VAM 2-110 W4N

COOLING		OUTDOOR TEMPERATURE DRY						
Indoor Conditions		21°C	25°C	30°C	35°C	40°C	45°C	50°C
21°C D 15°C W	Total capacity kW	9,22	8,92	8,55	8,13	7,72	7,30	6,68
	Sensitive capacity kW	7,38	7,14	6,84	6,50	6,18	5,84	5,34
	Input kW.	1,06	1,76	2,14	2,61	2,93	2,95	2,98
24°C D 17°C W	Total capacity kW	9,81	9,49	9,09	8,65	8,21	7,76	7,11
	Sensitive capacity kW	7,85	7,59	7,28	6,92	6,57	6,21	5,68
	Input kW.	1,10	1,81	2,21	2,69	3,02	3,05	3,08
27°C D 19°C W	Total capacity kW	10,33	9,99	9,57	9,10	8,65	8,17	7,48
	Sensitive capacity kW	8,26	7,99	7,66	7,28	6,92	6,54	5,98
	Input kW.	1,13	1,87	2,28	2,78	3,11	3,14	3,17
32°C D 23°C W	Total capacity kW	11,57	11,19	10,72	10,19	9,68	9,15	8,38
	Sensitive capacity kW	9,25	8,95	8,58	8,15	7,75	7,32	6,70
	Input kW.	1,25	2,06	2,51	3,07	3,44	3,47	3,50

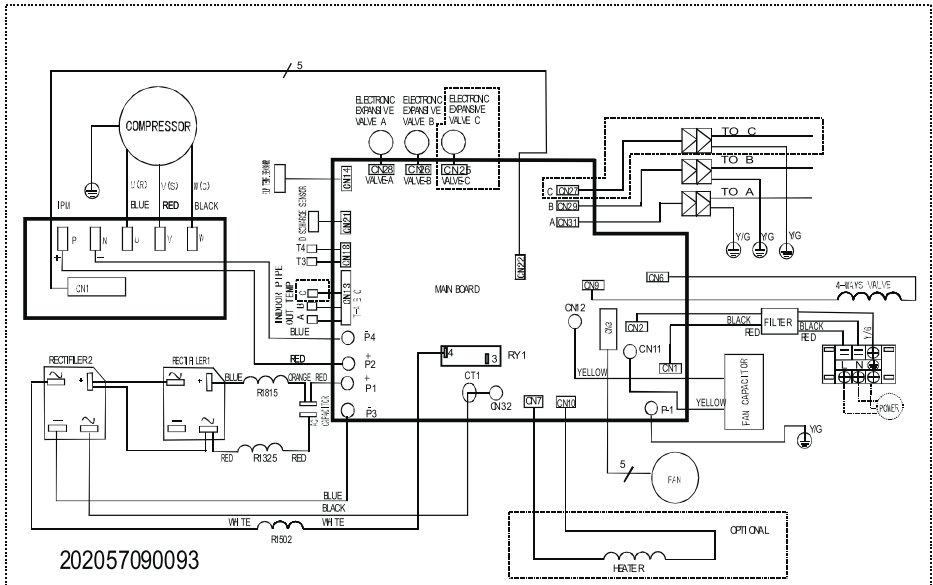
HEATING		OUTDOOR CONDITIONS							
Indoor Conditions		24°C D 18°C W	12°C D 11°C W	7°C D 6°C W"	4°C D 3°C W	0°C D -1°C W	-5°C D -6°C W	-7°C D -8°C W"	-15°C D -16°C W"
15°C	Capacity kW	10,25	11,48	11,11	9,16	8,61	7,78	7,05	3,33
	Input kW.	0,99	2,07	3,00	3,03	2,70	2,20	2,05	1,54
18°C	Capacity kW	9,78	10,96	10,61	8,75	8,22	7,42	6,73	3,18
	Input kW.	0,95	1,99	2,89	2,92	2,60	2,12	1,97	1,48
20°C	Capacity kW	9,32	10,44	10,10	8,33	7,83	7,07	6,41	3,03
	Input kW.	0,92	1,92	2,78	2,81	2,50	2,04	1,90	1,43
22°C	Capacity kW	8,94	10,02	9,70	8,00	7,51	6,79	6,16	2,91
	Input kW.	0,93	1,94	2,81	2,84	2,53	2,06	1,92	1,44
27°C	Capacity kW	8,11	9,08	8,79	7,25	6,81	6,15	5,58	2,64
	Input kW.	0,94	1,96	2,85	2,87	2,56	2,09	1,94	1,46

4- WIRING DIAGRAMS

Indoor units



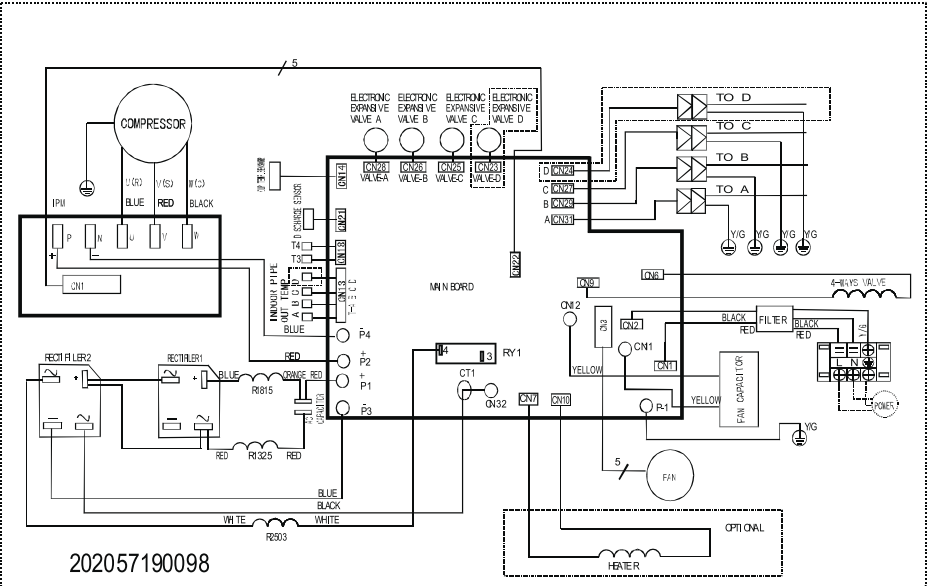
Outdoor unit Multi 1x2



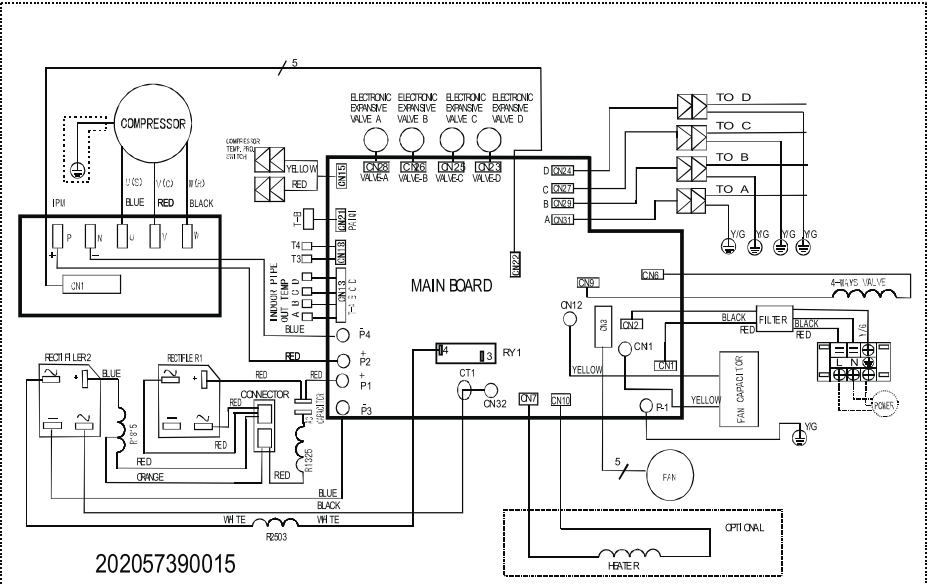
ENG

4- WIRING DIAGRAMS

Outdoor unit Multi 1x3



Outdoor unit Multi 1x4



5- ERROR CODES

Error Codes for indoor unit

Display	LED STATUS
E0	EEPROM error
E1	Communication error between indoor and outdoor unit
E2	Zero-crossing examination error
E3	Fan speed beyond control
E5	Outdoor units temp. sensor or connector of temp. sensor is defective
E6	Indoor units temp. sensor or connector of temp. sensor is defective
P0	Inverter module protection
P1	Outdoor voltage protection
P2	Compressor temp. protection
P3	Compressor current protection
P4	Inverter compressor drive error
P5	Mode conflict

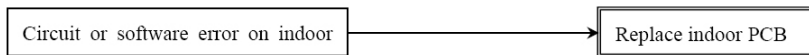
LED error code display for outdoor unit

Display	LED STATUS
E0	EEPROM error
E1	No 1 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E2	No 2 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E3	No 3 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E6	No 4 Indoor units pipe temp. sensor or connector of pipe temp. sensor is defective
E4	Outdoor temp. sensor or connector of temp. sensor is defective
E5	Compressor volt protection
E7	Communication error between outdoor IC and DSP
P0	Compressor temp. protection
P1	High pressure protection (just for 27K and 36K 1x4 units.)
P2	Low pressure protection (just for 27K and 36K 1x4 units.)
P3	Compressor current protection
P4	Inverter module protection
P6	Condenser high-temperature protection
P7	Compressor driving protection

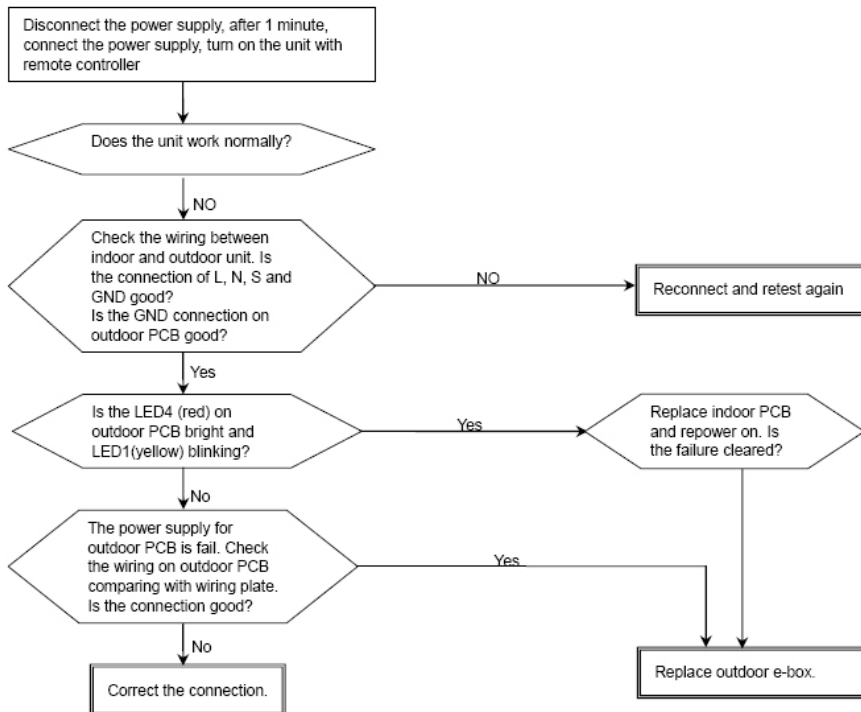
6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

6.1 INDOOR UNIT

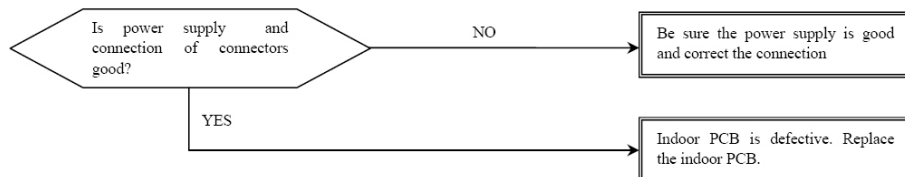
EO: EEPROM error



E1: Outdoor communication error

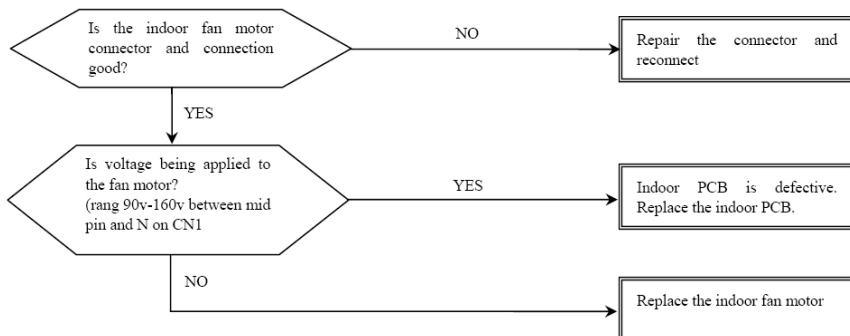


E2: Zero-crossing signal error

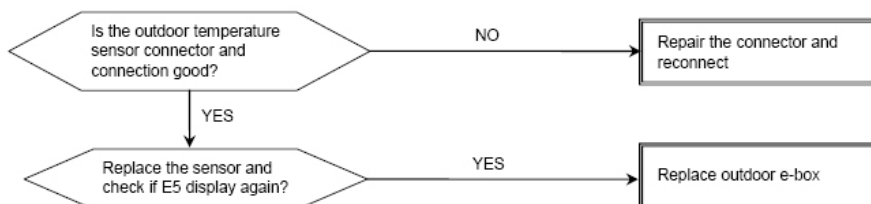


6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

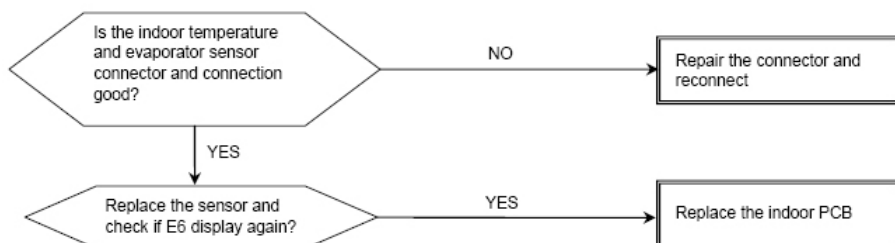
E3: Fan speed out of control



E5: Open or short circuit of outdoor temperature sensor

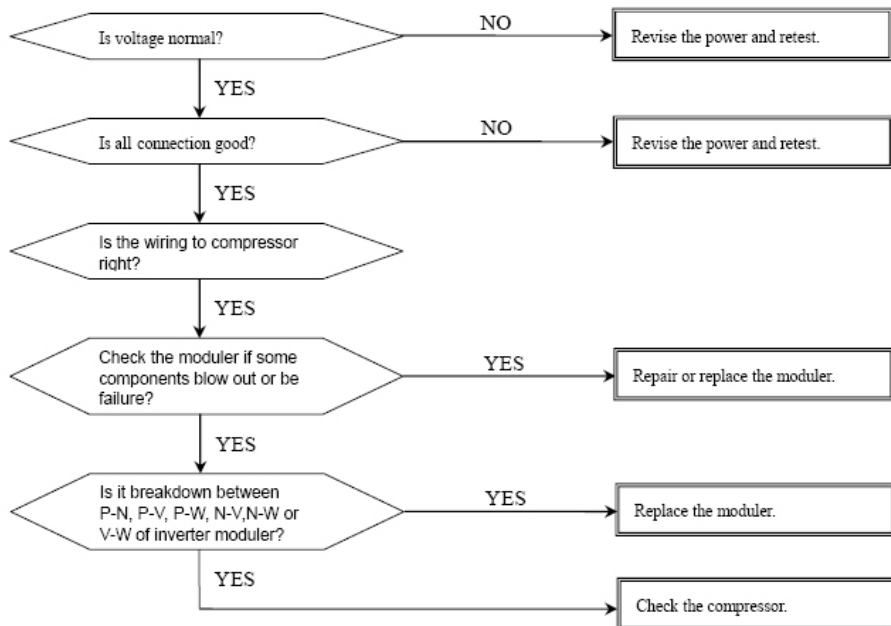


E6: Open or short circuit of room or evaporator temperature sensor

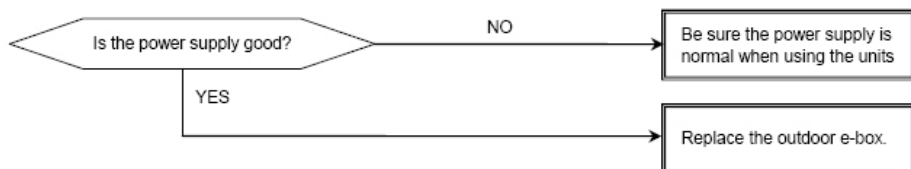


6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

Po: Inverter module protection

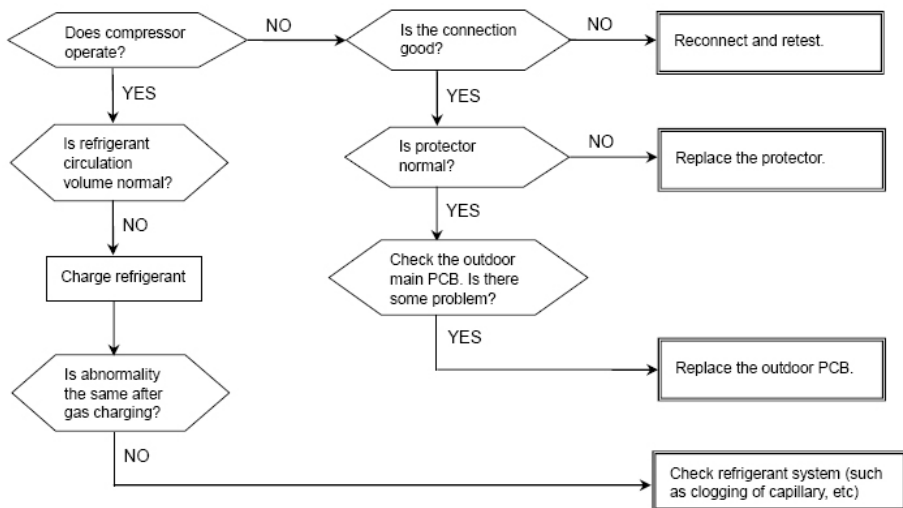


P1: Over voltage or too low voltage protection



6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

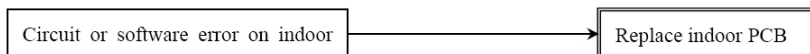
P2: Temperature protection of compressor top



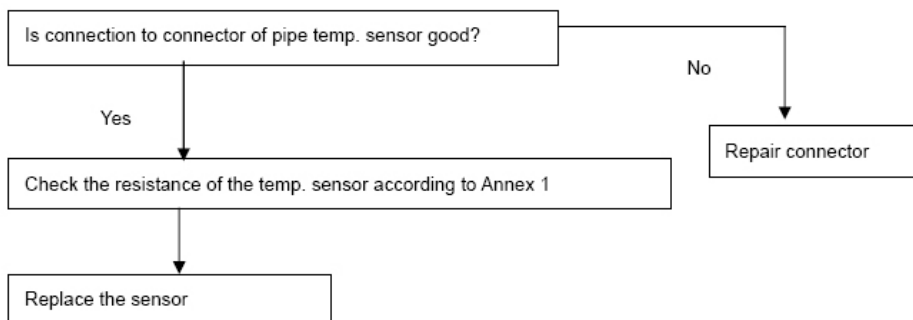
P3: Compressor current protection (same as Outdoor compressor current protection)

6.2 OUTDOOR UNIT

EO: EEPROM error



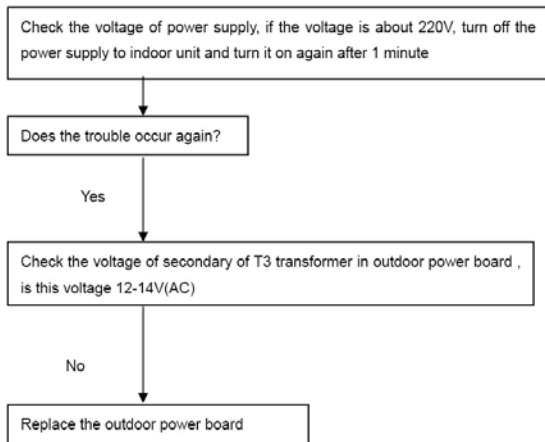
E1, E2, E3, E6, E4: Indoor or outdoor units pipe temp. sensor or connector of pipe temp. sensor is



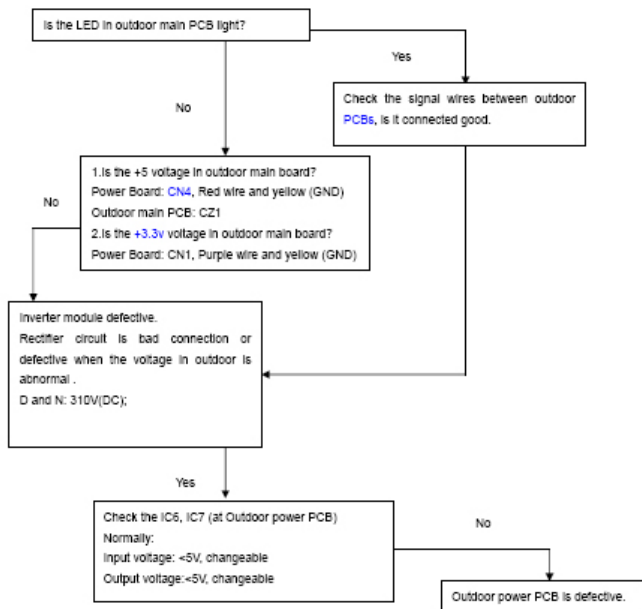
ENG

6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

E5: Voltage protection of compressor



E7: Indoor and outdoor communication error



Outdoor unit display	LED STATUS
P0	Compressor top protection against temperature

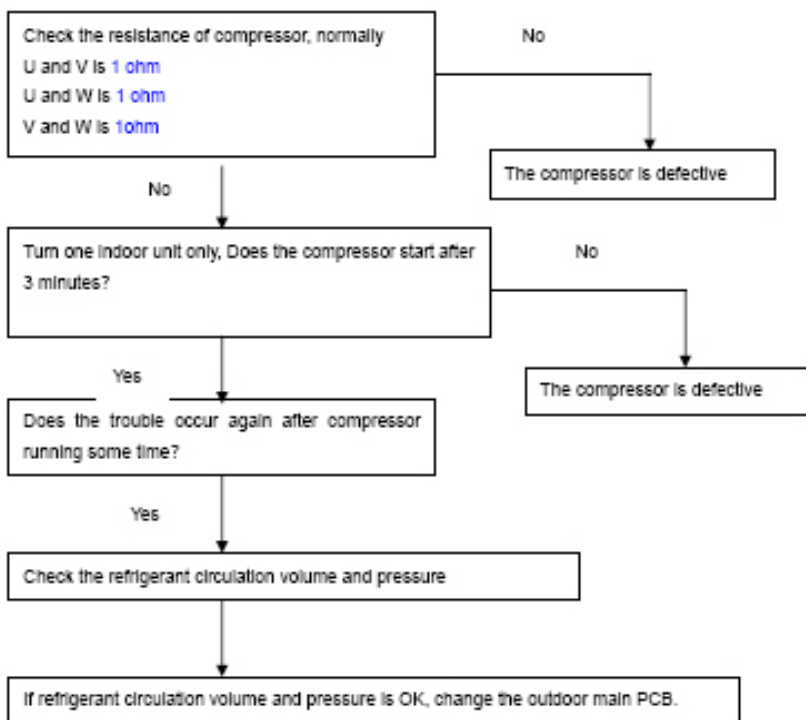
Off: 105c; On: 90c

The trouble shooting is same with the one of indoor unit P2 protection.

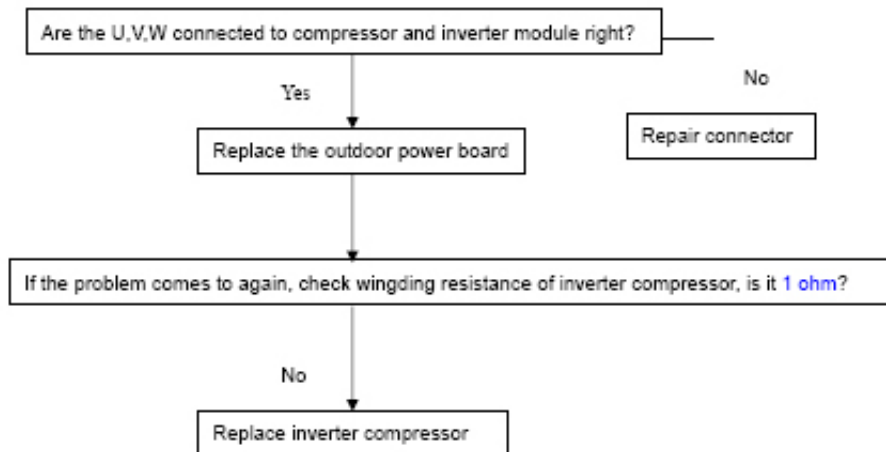
6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

P0: Compressor top protection against temperature (same as indoor unit P2 protection)

P3: Compressor current protection

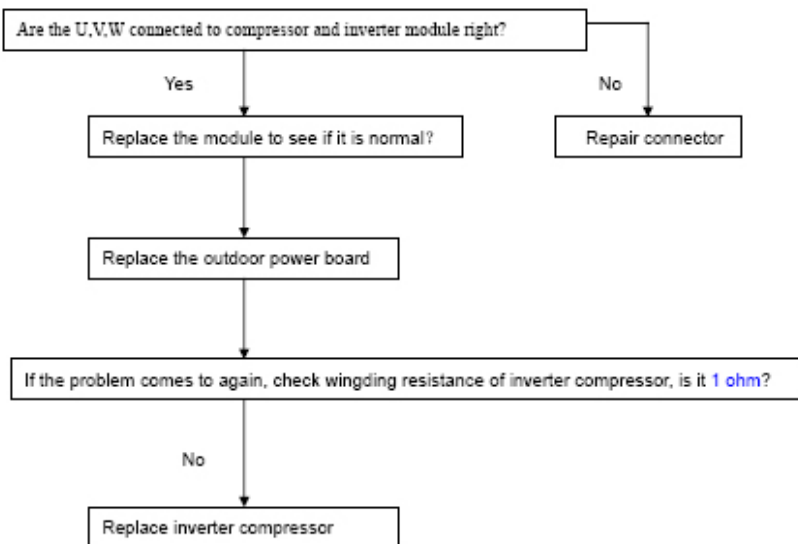


P4: Inverter module protection (drive protection arose)



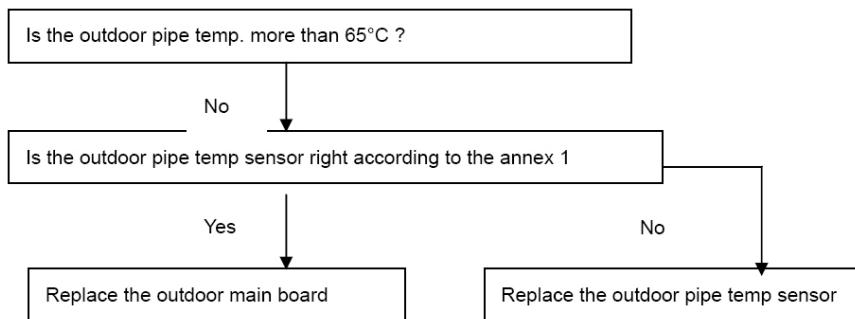
6- FLOW CHART OF DIAGNOSIS AND SOLUTIONS

P4 (LED flashes nine times): Inverter module protection (module protection arose)



P6: Condenser high-temperature protection.

When outdoor pipe temp. is more than 65°C, the unit will stop, and unit runs again when outdoor pipe temp. less than 52°C.

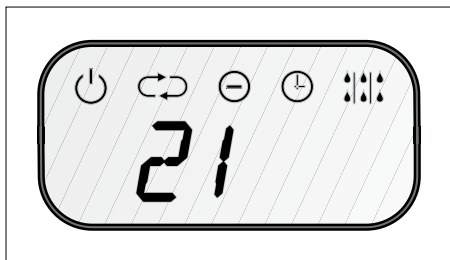


7- PCB EXPLANATION

7.1 ELECTRIC CONTROL WORKING ENVIRONMENT

- Input voltage: 175~253V.
- Input power frequency:50Hz.
- Indoor fan normal working amp. is less than 1A.
- Outdoor fan. Normal working amp. is less than 1.5A.
- Four-way valve normal working amp. is less than 1A.
- Swing motor: DC12V.

7.2 DISPLAY FUNCTION



Run indicator

Flash at 0.5Hz when the unit is standby. Illuminate when the unit is turned on.



Auto indicator

This indicator illuminates when the air conditioner is in AUTO operation.



Ion indicator

Illuminate when Ionizer/Plasma function is activated.

LED display control function.

Pressing “LED display” button on remote controller will turn off all displays on indoor unit, while pressing once again, all displays will resume.

7.3 OUTDOOR UNIT'S DIGITAL DISPLAY TUBE

There is a digital display tube in outdoor PCB.

Digital display tube display function

- In standby , The LED displays the number of indoor units.
- In compressor operation, the LED display the



Timer indicator

This indicator illuminates when TIMER is set ON/OFF.



DEF. Indicator

This indicator illuminates when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating mode.



Temperature indicator

Usually it displays the temperature settings. When change the setting temperature, this indicator begins to flash, and stops 20 seconds later. It displays the room temperature when the air conditioner is in FAN only operation, and the range of that is 0~50. When the unit stops operation, it returns to original factory settings. It will also display the error codes when malfunction or protection happen.

Frequency indicator

This indicator appears only when the compressor is in operation and indicates the current operating frequency.

frequency.

- In defrosting mode, The LED displays “dF”
- In compressor pre-heating, The LED displays “1 1”
- In protection or malfunction, the LEC displays error code or protection code.

7- PCB EXPLANATION

7.4 OUTDOOR UNIT POINT CHECK FUNCTION

There is a check switch in outdoor PCB.

Push the switch SW1 to check the states of unit when the unit is running. The digital display tube will display the follow procedure when push SW1 each time:

	Display	Remark
1	Indoor unit capacity demand code	
2	Outdoor unit running mode code	Off:0, Cooling:1, Heating:2
3	Amendatory capacity demand code	
4	Outdoor unit fan motor state	Off:0, Low speed:1, High speed:2
5	Evaporator outlet temp. for 1# indoor unit	Actual data
6	Evaporator outlet temp. for 2# indoor unit	Actual data
7	Evaporator outlet temp. for 3# indoor unit	Actual data
8	Evaporator outlet temp. for 4# indoor unit	Actual data
9	Condenser pipe temp.	Actual data
10	Ambient temp.	Actual data
11	Compressor discharge temp.	Actual data
12	Inverter current	Actual data
13	EXV open angle for 1# indoor unit	Actual data×8
14	EXV open angle for 2# indoor unit	Actual data×8
15	EXV open angle for 3# indoor unit	Actual data×8
16	EXV open angle for 4# indoor unit	Actual data×8
17	Indoor unit number	The indoor unit can communicate with outdoor unit well.
18	The last error or protection code	00 means no malfunction
19		Check point over

Frequency of compressor:

Display	Frequency of compressor (Hz)
30	30
--	Stand by
60	60

Running mode:

Display	Corresponding mode
0	Off
1	Cooling mode
2	Heating mode

Capacity demand:

Cooling mode

Capacity	2000-2500	2000-2500	3000-3800	4500-5000	5000-5500	5500-6100	6100-7000	7000-7500	7500-8000	7500-8000
Corresponding Code	1	2	3	4	5	6	7	8	9	≥10

Heating mode

Capacity	2000-2500	2000-2500	3000-3800	4500-5000	5500-6100	6100-7000	6100-7000	7000-7500	7500-8000	8000-8900
Corresponding Code	1	2	3	4	5	6	7	8	9-10	≥11

Note: The capacity is just for reference.

7- PCB EXPLANATION

Number of indoor unit

Display	Number of indoor unit
1	1
2	2
3	3

Outdoor ambient temp:

Display	Corresponding temp.	Display	Corresponding temp.	Display	Corresponding temp.
15	-7.5	50	10	80	25
16	-7	51	10.5	81	25.5
17	-6.5	52	11	82	26
18	-6	53	11.5	83	26.5
19	-5.5	53	11.5	84	27
20	-5	54	12	85	27.5
21	-4.5	55	12.5	86	28
22	-4	56	13	87	28.5
23	-3.5	57	13.5	88	29
24	-3	58	14	89	29.5
26	-2	59	14.5	90	30
27	-1.5	60	15	91	30.5
28	-1	61	15.5	92	31
29	-0.5	62	16	93	31.5
30	0	63	16.5	93	31.5
31	0.5	63	16.5	94	32
32	1	64	17	95	32.5
33	1.5	65	17.5	96	33
34	2	65	17.5	97	33.5
35	2.5	66	18	98	34
36	3	67	18.5	99	34.5
37	3.5	68	19	10.	35~40
38	4	69	19.5	11.	40~45
39	4.5	70	20	12.	45~50
40	5	71	20.5	13.	50~55
41	5.5	72	21	14.	55~60
42	6	73	21.5	15.	60~65
43	6.5	74	22	16.	65~70
44	7	75	22.5		
45	7.5	75	22.5		
46	8	76	23		
47	8.5	77	23.5		
48	9	78	24		
49	9.5	79	24.5		

Current of outdoor unit

Display	Corresponding mode
44	6.0 A
46	6.2 A
54	7.4 A
55	7.6 A

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58	7.6 A
62	8.0 A
66	8.6 A
67	8.8 A
68	9.0 A
70	9.2 A
72	9.5 A
76	10.0 A
78	10.2 A
80	10.4 A
82	10.6 A
84	11.0 A
88	11.6 A
92	12.0 A
94	12.2 A

-No. 1 opening degree of electronic expansion valve:

Opening degree equals the display data times 8

-No. 2 opening degree of electronic expansion valve:

Opening degree equals the display data times 8

-No. 3 opening degree of electronic expansion valve:

Opening degree equals the display data times 8

7.5 PROTECTION

-3 minutes delay at restart for compressor.

-Discharge temperature protection of compressor, compressor stops when the temp. of discharge is more than 115 and last out 10 s. compressor runs when the temp. of discharge is less than 90 .

-Temperature protection of compressor top, compressor stops when the temp. of top of compressor is more than 120 , compressor runs when the temp. of top of compressor is less than 105 .

-When AC voltage 265V for 30 seconds, Outdoor Unit stops operation and alarms. When AC voltage 265V for 30 seconds, Outdoor Unit resumes operation.

-Inverter module Protection , Inverter module Protection itself has a protection function against current, voltage and temperature.

-Sensor protection at open circuit and breaking disconnection

-Fan Speed is out of control. When Indoor Fan Speed is too high(higher than High Fan+300RPM) or too low(lower than 400RPM), the unit stops and LED displays failure information and can't return to normal operation automatically.

-Cross Zero signal error warning. If there is no Cross Zero signals in 4 minutes, the unit stops and LED displays failure information and can't return to normal operation automatically.

-Current protection: When the current is more than 'X' A, the compressor stops.

(X is 7A for 14K 1x2 unit, is 14A for 18K 1x2 unit, is 13.5A for 21 1x3 unit, is 15A for 27K 1x3 unit, is 16A for 27K 1x4 unit and is 21.5A for 36K 1x4 unit.)

-Outdoor condenser high temperature protection: Under cooling mode, if $T_3 > 65$ for 3 minutes, the compressor will stop. When $T_3 < 52$, the protection is not valid.

-Pressure protection (just be available for 27K and 36K 1x4 unit): If low pressure is lower 0.03MPa, the compressor will stop and when low pressure is higher than 0.10MPa, the compressor will restart. If high pressure is higher than 3.3MPa,

7- PCB EXPLANATION

the compressor will stop and when high pressure is lower than 2.4MPa, the compressor will restart.

-Compressor pre-heating function: When the outdoor temperature is lower than 3 and the compressor stops operation for more than 3 hours, or the outdoor temperature is lower than 3 and the power is just put on, the compressor enters into pre-heating condition. When outdoor temp. is more than 5 or user operate it, pre-heating condition will finish.

7.6 FAN-ONLY MODE

Fan speed is high/mid/low/ Auto

7.7 COOLING MODE

-Indoor fan keeps running, fan speed can be set in high/mid/low/ Auto:

-Auto fan at cooling mode: (T=Indoor Temp.-Setting Temp.)

	Condition	Indoor fan speed
Room temp. up	$T < 1.5$	Low
	$1.5 < T < 4$	Mid.
	$T > 4$	High
Room temp. down	$T > 3$	High
	$1 < T < 3$	Mid.
	$T < 1$	Low

-Anti-freezing control to indoor evaporator at cooling mode (T: evaporator temp.)

Evaporator Temp.	Compressor
$T < 4$	Off
$T > 8$	On

7.8 DEHUMIDIFYING MODE

-The indoor fan is fixed in low speed

-Low room temperature protection:

When room temperature decreases to below 10°C, indoor fan stop, when room temperature restores to over 12°C, indoor fan start.

-At dehumidifying mode, the anti-freezing function of the indoor heat exchanger is the same as that of cooling mode.

7.9 HEATING MODE

-Indoor Fan actions at heating mode

Indoor Fan can be set at HIGH/MID/LOW/AUTO by using a remote controller, but

Anti-cold wind function prevails.

Anti-cold wind control function at heating mode

	Condition T= Indoor exchanger temp.	Indoor fan speed
Indoor exchanger temp. up	$T < 34$	Off
	$34 < T < 37$	Breeze
	$37 < T < 44$	Low speed
	$T > 44$	Setting fan speed
Indoor exchanger temp. down	$T > 38$	Setting fan speed
	$33 < T < 38$	Low speed
	$24 < T < 33$	Breeze
	$T < 24$	Off

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Auto wind at heating mode

	Condition T=Indoor Temp.-Setting Temp.	Indoor fan speed
Room temp. up	$T < 1.5$	High
	$1.5 < T < 2.5$	Mid.
	$T > 2.5$	Low
Room temp. down	$T < 1.0$	High
	$1.0 < T < 2.0$	Mid.
	$T > 2.0$	Low

Indoor evaporator high-temperature protection at heating mode

Condition T= Indoor exchanger temp.	Compressor
$T < 48$	On
$53 < T < 63$	Decrease frequency of compressor
$T > 63$	Off

Defrosting operation (Available for heating only).

7.10 DEFROST

-Defrosting condition: The temperature of outdoor heat exchanger remains consecutively lower than -2°C for more than 40 minutes,

-Ending condition of defrosting: If one of following conditions is satisfied, end the defrost and turn into heating mode:

- The defrost time has reached to 10 minutes.
- When the temperature of outdoor heat exchanger rises up to 15°C

-Defrosting Actions:

- Compressor runs
- 4 way valve switches off
- Outdoor fan switches off
- Indoor fan running according to anti-cold wind function in heating mode

7.11 AUTOMATIC OPERATION MODE

The air conditioner automatically selects one of the following operation modes: cooling, heating or fan only according to the temp. difference between room temp. (TA) and set temp. (TS).

TA-TS	Operation mode
$TA-TS > 2^{\circ}\text{C}$	Cooling
$-1^{\circ}\text{C} \leq TA-TS \leq +2^{\circ}\text{C}$	Fan-only
$TA-TS < -1^{\circ}\text{C}$	Heating (air-only for cooling only type)

7.12 MANUAL SWITCH

-Mode changes when push this button .

Cooling mode Auto mode Unit off Cooling mode

-At Cooling mode, after 30 minutes cooling operation whose fan speed is set as low, the A/C operates with a setting temp. of 24°C .

-At auto mode, the A/C operates with a set temp. of 24°C

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7.13 TIMER FUNCTION

-The maximum length of timer is 24 hours and the minimum resolving power is 15 minutes.

-Timer on: first turn off the A/C, the A/C will be automatically on at the set time.

-Timer off: first turn on the A/C, the A/C will be automatically off at the set time

-Timer on/off function(on time is earlier than off time): first turn off the A/C, it will be automatically on at set time, and later be off at the set time, then unit turns on at set time.

-Timer off/on function(off time is earlier than on time): first turn on the A/C, it will be automatically off at set time, and later be on at the set time, then unit turns off at set time.

7.14 SLEEP MODE

-It is available at cooling, heating or auto mode.

-Cooling: The set temperature rise 1°C per hour. Two hours later, the set temperature will maintain as a constant and the fan speed is kept at low speed.

-Heating: The set temperature decrease 1°C per hour. Two hours later, the set temperature will maintain as a constant and the air circulation is kept at low speed (Cold air proof function takes precedence over all).

-Auto: The Sleep Mode running function operates in accordance with selected running mode by auto mode.

-After 7 hours, unit cancels this mode automatically.

J2	On	On	Off	Off
J3	On	Off	On	Off
Stop time	7 hours	8 hours	6 hours	7 hours

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

7.15 MODE CONFLICT

The indoor units can not work cooling mode and heating at same time. Heating mode has a priority.

Definition

	Cooling mode	Heating Mode	Fan	Off
Cooling mode	No	Yes	No	No
Heating Mode	Yes	No	Yes	No
Fan	No	Yes	No	No
Off	No	No	No	No

No: No mode conflict

Yes: Mode conflict

-Unit action

- In case of one Indoor unit working in cooling mode or fan mode, and another indoor unit is set to heating mode, the indoor unit working in cooling mode or fan mode will change to stand by. The outdoor unit will work in heating mode.

- In case of one Indoor unit working in heating mode, and another indoor unit is set to cooling mode or fan mode, the indoor unit setting to cooling mode or fan mode will change to stand by.

7- PCB EXPLANATION

CHARACTERISTIC OF TEMPERATURE SENSOR

Temp.	Resistance K	Temp.	Resistance K	Temp.	Resistance K
-10	62.2756	17	14.6181	44	4.3874
-9	58.7079	18	13.918	45	4.2126
-8	56.3694	19	13.2631	46	4.0459
-7	52.2438	20	12.6431	47	3.8867
-6	49.3161	21	12.0561	48	3.7348
-5	46.5725	22	11.5	49	3.5896
-4	44	23	10.9731	50	3.451
-3	41.5878	24	10.4736	51	3.3185
-2	39.8239	25	10	52	3.1918
-1	37.1988	26	9.5507	53	3.0707
0	35.2024	27	9.1245	54	2.959
1	33.3269	28	8.7198	55	2.8442
2	31.5635	29	8.3357	56	2.7382
3	29.9058	30	7.9708	57	2.6368
4	28.3459	31	7.6241	58	2.5397
5	26.8778	32	7.2946	59	2.4468
6	25.4954	33	6.9814	60	2.3577
7	24.1932	34	6.6835	61	2.2725
8	22.5662	35	6.4002	62	2.1907
9	21.8094	36	6.1306	63	2.1124
10	20.7184	37	5.8736	64	2.0373
11	19.6891	38	5.6296	65	1.9653
12	18.7177	39	5.3969	66	1.8963
13	17.8005	40	5.1752	67	1.830
14	16.9341	41	4.9639	68	1.7665
15	16.1156	42	4.7625	69	1.7055
16	15.3418	43	4.5705	70	1.6469

1. Reference voltage data:

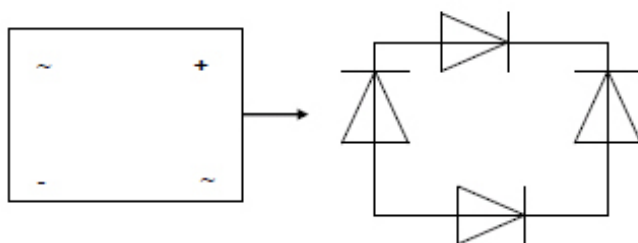
- a) Rectifier : Input :220-230V(AC), output :310V(DC)
 b) Inverter module: U,V, W 3ph.

	Result
U-V	60-150V(AC)
U-W	60-150V(AC)
V-W	60-150V(AC)
P-N	DC 310V

- c) Photo-couple PC817, PC851: Control side <+5V, AC side :< 24V(AC)
 d) S terminal and N: changeable from 0-24V

2. Check the Diode Bridge component (In wiring diagram, rectifier)

Remark: If this part is abnormal, the LED will not light.



Multi-meter		Result	
		Forward Resistance	Backward Resistance
+	-	Infinite	Infinite
~	+	~500 ohm	Infinite
~			
-	~	~500 ohm	Infinite
	~		

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