



Service Manual

**MODEL: CFT 35 INV-Ri
CFT 50 INV-Ri
CFT 70 INV-Ri
CFT 100 INV-Ri
CFT 140 INV-Ri
CFT 170INV-Ri**

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Part 1

General Information

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1. Model Names of Indoor/Outdoor Units

1.1 Indoor Units

Model name	Dimension (W×H×D) (mm)	Net/Gross weight (kg)	Power supply
DCT 35 INV-Si	920×210×635	25/29	220~240V-1ph-50Hz
DCT 50 INV-Si	920×210×635	26/30	220~240V-1ph-50Hz
DCT 70 INV-Si	920×270×635	30/34	220~240V-1ph-50Hz
DCT 90 INV-Si	1140×270×775	41/46	220~240V-1ph-50Hz
DCT 100 INV-Si	1140×270×775	41/46	220~240V-1ph-50Hz
DCT 140 INV-Si	1200×300×865	49/55	220~240V-1ph-50Hz
DCT 170 INV-Si	1200×300×865	49/55	220~240V-1ph-50Hz
CFT 35 INV-Ri	990×203×660	27/33	220~240V-1ph-50Hz
CFT 50 INV-Ri	990×203×660	29/35	220~240V-1ph-50Hz
CFT 70 INV-Ri	990×203×660	29/35	220~240V-1ph-50Hz
CFT 90 INV-Ri	1280 ×203× 660	37/42	220~240V-1ph-50Hz
CFT 100 INV-Ri	1280 ×203× 660	37/42	220~240V-1ph-50Hz
CFT 140 INV-Ri	1670× 240× 680	52/59	220~240V-1ph-50Hz
CFT 170 INV-Ri	1670× 240× 680	52/59	220~240V-1ph-50Hz
CCT 50 INV-Si	840x230x840	28/34	220~240V-1ph-50Hz
CCT 70 INV-Si	840x230x840	29/36	220~240V-1ph-50Hz
CCT 90 INV-Si	840x300x840	36/41	220~240V-1ph-50Hz
CCT 100 INV-Si	840x300x840	36/41	220~240V-1ph-50Hz
CCT 140 INV-Si	840x300x840	36/41	220~240V-1ph-50Hz
CCT 170 INV-Si	840x300x840	42/50	220~240V-1ph-50Hz
CCT 301 INVi	580x254x580	18/27.5	220~240V-1ph-50Hz
CCT 501 INVi	580x254x580	21/28	220~240V-1ph-50Hz

1.2 Outdoor Units

Model name	Dimension (W×H×D) (mm)	Net/Gross weight (kg)	Power supply
CCT 301 INVo CFT 35 INV-Ro DCT 35 INV-So	761×593×279	39.5/42.5	220~240V-1ph-50Hz
CCT 501 INVo CCT 50 INV-So CFT 50 INV-Ro DCT 50 INV-So	842×695×324	59/63	220~240V-1ph-50Hz
CCT 70 INV-So CFT 70 INV-Ro DCT 70 INV-So	895×862×313	73/76	220~240V-1 Ph-50Hz
CCT 100 INV-So-1 CFT 100 INV-Ro-1 DCT 100 INV-So-1	940×1245×360	106/114	220~240V-1ph-50Hz
CCT 90 INV-So CFT 90 INV-Ro DCT 90 INV-So	990×966×354	92/100	220~240V-1ph-50Hz
CCT 100 INV-So CFT 100 INV-Ro DCT 100 INV-So	990×966×354	87/95	380V-3ph-50Hz
CCT 140 INV-So-1 CFT 140 INV-Ro-1 DCT 140 INV-So-1	940×1245×360	106/114	220~240V-1ph-50Hz

CCT 140 INV-So CFT 140 INV-Ro DCT 140 INV-So	940×1245×360	99/107	380V-3ph-50Hz
CCT 170 INV-So CFT 170 INV-Ro DCT 170 INV-So	940×1245×360	115/121	380V-3ph-50Hz
DHP 170 INV -Ro	940×1245×360	124/130	380~415V-3 Ph-50Hz

2. External Appearance

2.1 Indoor units

Ceiling & Floor



2.2 Outdoor unit

CCT 301 INV-0, CFT 35 INV-R-0, DCT 35 INV-So



CCT 501 INV-0, CCT 50 INV-So,
CFT 50 INV-R-0, DCT 50 INV-So



CCT 70 INV-So, CFT 70 INV-R-0, DCT 70 INV-So



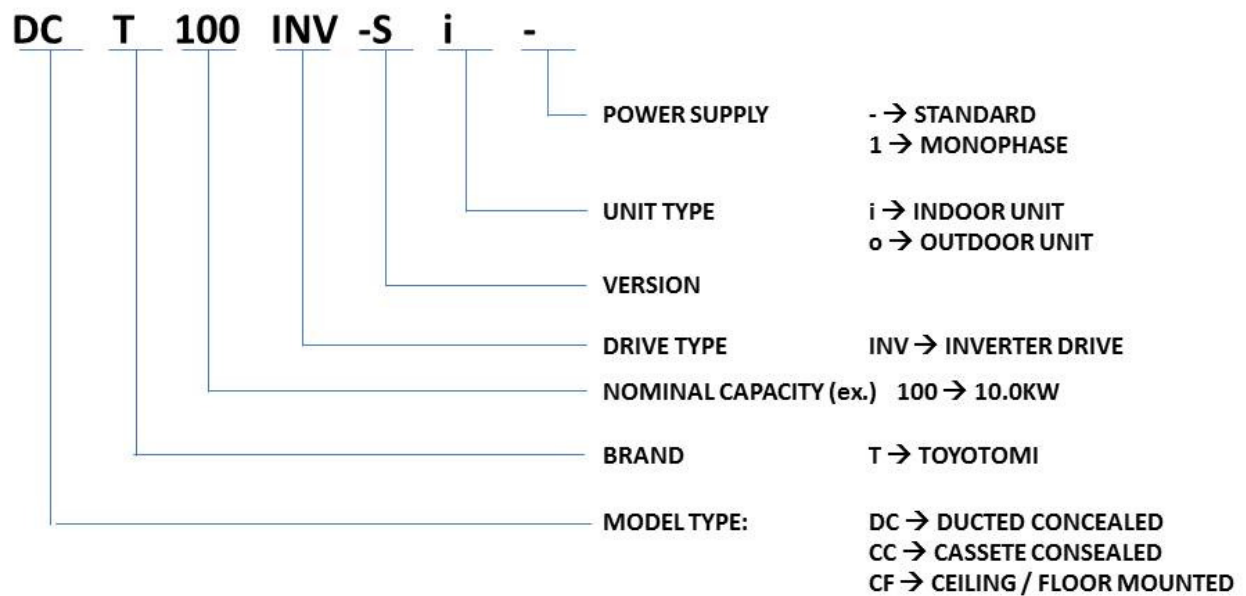
CCT 90 INV-So, CFT 90 INV-R-0, DCT 90 INV-So
CCT 100 INV-So, CFT 100 INV-R-0, DCT 100 INV-So



CCT 100 INV-So-1, CFT 100 INV-R-0-1, DCT 100 INV-So-1
CCT 140 INV-So-1, CFT 140 INV-R-0-1, DCT 140 INV-So-1
CCT 140 INV-So, CFT 140 INV-R-0, DCT 140 INV-So
CCT 170 INV-So, CFT 170 INV-R-0, DCT 170 INV-So
DHP 170 INV -R-0



3. Nomenclature



4. Features

4.1 Universal outdoor unit design

Indoor unit with the same capacity can match with the same outdoor unit.

4.2 High efficiency and energy saving.

Thanks to the DC inverter technology and optimized piping system, the EER and COP of whole series can easily reach A-class.

4.3 Low noise and low starting current.

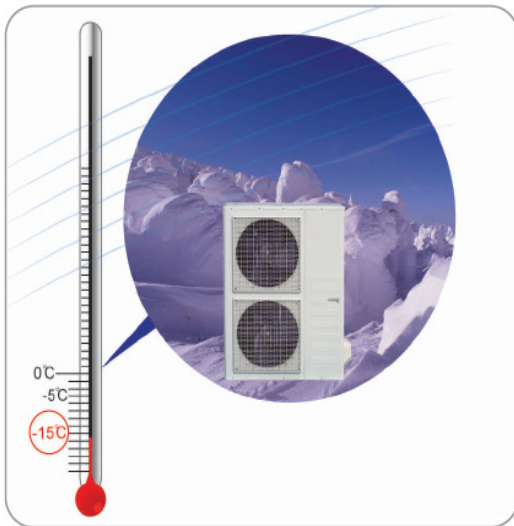
Thanks to the DC inverter technology, the system can work with low noise, and very small starting current.

4.4 Intelligent refrigerant adjustment technology.

Throttle part is made up of capillary and electronic expansion valve (EXV). The outdoor unit can output the most accurate capacity in any condition.

4.5 Working in cooling mode under -15°C.

Outdoor unit built-in with low ambient kit, it can control the outdoor unit's fan and cooling can be performed throughout the year for computer rooms, banquet halls, etc. Wide operation range covers outdoor temperatures as low as -15°C for cooling.



4.6 Indoor & outdoor unit's power supply is separate.

4.7 All indoor units have network control function.

4.8 All indoor units have Auto-restart function.

Part 2

Indoor Units

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Ceiling and Floor Type

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1. Features

1.1. New design, more modern and elegant appearance.

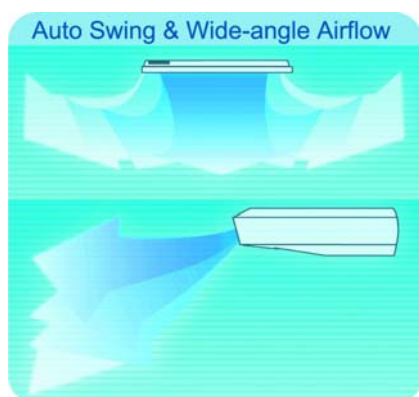


1.2. Convenient installation

- The ceiling type can be easily installed into a corner of the ceiling even if the ceiling is very narrow
- It is especially useful when installation of an air conditioner in the center of the ceiling is impossible due to a structure such as one lighting

1.3. Two direction auto swing (vertical & horizontal) and wide angle air flow

- Air flow directional control minimizes the air resistance and produces wider air flow to vertical direction.
- The range of horizontal air discharge is widened which secures wider air flow distribution to provide more comfortable air circulation no matter where the unit is set up



1.4. Three level fan speed, more humanism design, meets different air-supply requirement.

1.5. Water proof by utilizing the absorbing plastic film on water collector

1.6. Easy operation. Auto-restart function, remote control and optional wire control method.

1.7. Low noise level plus compact size

- Shape of the blades has been improved to prevent noise caused by turbulence.

2. Specifications

Model	Indoor	Model name	CFT 35 INV-Ri	CFT 50 INV-Ri
		Code	220044000060	220044100120
		Power supply	220~240V-1 Ph-50Hz	220~240V-1 Ph-50Hz
	Outdoor	Model name	CFT 35 INV-Ro	CFT 50 INV-Ro
		Code	220075100071	220075200340
		Power supply	220~240V-1 Ph-50Hz	220~240V-1 Ph-50Hz
Cooling	Capacity(Max.-Rated-Min.)	KW	4.0-3.52-1.4	5.65-5.28-1.63
	Input(Max.-Rated-Min.)	KW	1.27-1.09-0.32	2.6-1.63-0.57
	Current(Max.-Rated-Min.)	A	5.9-5.01-1.68	12.3-7.10-2.47
	EER		3.24	3.24
Heating	Capacity(Max.-Rated-Min.)	KW	4.75-4.0-1.4	6.15-5.86-1.45
	Input(Max.-Rated-Min.)	KW	1.38-1.07-0.36	2.34-1.59-0.72
	Current(Max.-Rated-Min.)	A	6.41-5.05-1.89	11.07-6.91-3.13
	COP		3.73	3.69
Max. input consumption		W	2250	2400
Max. current		A	12	13.1
Compressor	Model		DA108X1C-20FZ3	C-6RVN93H0V
	Type		Rotary DC Inverter	Rotary DC Inverter
	Brand		MIDEA TOSHIBA	Shenyang SANYO
	Capacity	Btu/h	10918.4	19277.8
	Input	W	855	1470
	Rated current(RLA)	A	5.3	8.96
	Thermal protector		-	-
	Capacitor	uF	-	-
	Refrigerant oil	ml	ESTER OIL VG74 480ml	FV 50S, 350
Indoor fan motor	Model		YSK25-6L	YSK55-4L
	Type		AC Motor	AC Motor
	Input	w	33.4/31.1/29.5	125/105/85
	Capacitor	uF	1.5uF/450V	2.5uF/450V
	Speed(hi/mi/lo)	r/min	756/666/592	1310/1190/1040
Indoor coil	a.Number of rows		3	3
	b.Tube pitch(a)x row pitch(b)	mm	25.4×22	25.4 x 22
	c.Fin spacing	mm	1.7	1.7
	d.Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum
	e.Tube outside dia.and type	mm	Φ9.53 Inner grooved copper tube	Φ9.53 Inner grooved copper tube
	f.Coil length x height x width	mm	804x254x66	828x254x66
	g.Number of circuits		3	3
Indoor air flow (Hi/Mi/Lo)		m ³ /h	584/518/463	800/600/500
Sound level (sound pressure)		dB(A)	39/36/33	43/41/38
Indoor unit	Dimension (W x H x D)	mm	990x203x660	990 x203 x660
	Packing (W x H x D)	mm	1089x296 x744	1089 x296 x744
	Net/Gross weight	kg	27/33	29/35
Outdoor fan motor	Model		YDK24-6G	YDK53-6Y
	Type		AC MOTOR	AC MOTOR
	Input	W	67/48	129/86

	Capacitor	uF	2.5/450V	3uF/450V
	Speed	r/min	800/550	770/560
Outdoor coil	Number of rows		2	2
	Tube pitch(a)x row pitch(b)	mm	25.4×22	22×19.05
	Fin spacing	mm	1.4	1.4
	Fin type (code)		Hydrophilic aluminium	Hydrophilic aluminium
	Tube outside dia.and type	mm	Φ9.53 Inner grooved copper tube	7.94 Inner grooved copper tube
	Coil length x height x width	mm	654×558.8×44	778×660×38.1
	Number of circuits		2	2
Outdoor air flow(Hi/Low)		m ³ /h	2500/1600	2570/2300
Sound level(sound pressure)(Hi/Low)		dB(A)	48/44	51/46
Outdoor unit	Dimension(WxDxH)	mm	761×593×279	842×695×324
	Packing (WxDxH)	mm	887×655×355	965×752×399
	Net/Gross weight	kg	39.5/42.5	59/63
Refrigerant	Type		R410A	R410A
	Charged volume	g	1400	1600
Throttle type			Capillary	Electronic expansion valve & Capillary
Design pressure(Hi/Low)		MPa	4.2/2.0	4.2/2.0
Refrigerant piping	Liquid side/ Gas side	mm	Φ6.4/Φ12.7	6.4/12.7
	Max. refrigerant pipe length	m	10	25
	Max. difference in level(Outdoor is up)	m	6	12
	Max. difference in level (Outdoor is down)	m	5	9
Connection wiring	Power wiring (Indoor)	mm ²	3×1.5	3 core x 1.0
	Power wiring (Outdoor)	mm ²	—	3 core x 2.5
	Signal wiring	mm ²	4×1.5	3-core shielded wire x0.5
Drainage water pipe dia. (Indoor)		mm	Φ25	Φ25
Wireless remote controller (Indoor)			R05/BGE (standard)	R05/BGE (standard)
Operation temp (Indoor)		℃	17-30	17-30
Ambient temp (Outdoor)		℃	Cooling: 0~43 (*) Heating: -15~24	Cooling: -15~43 (*) Heating: -15~24

(*) Optional Low Ambient Kit included. Cooling Operation Range: 7 to 43°C without it

Model	Indoor	Model name	CFT 70 INV-Ri	CFT 90 INV-Ri
		Code	220044200240	220044300000
		Power supply	220~240V-1 Ph-50Hz	220~240V-1 Ph-50Hz
	Outdoor	Model name	CFT 70 INV-Ro	CFT 90 INV-Ro
		Code	220075301070	220075401041
		Power supply	220~240V-1 Ph-50Hz	220~240V-1 Ph-50Hz
Cooling	Capacity(Max.-Rated-Min.)	KW	7.9-7.032-1.63	9.5-8.792-2.2
	Input(Max.-Rated-Min.)	KW	2.8-2.18-0.98	4.6-2.71-1.1
	Current(Max.-Rated-Min.)	A	13.2-9.9-4.26	23-11.78-4.78
	EER		3.22	3.24
Heating	Capacity(Max.-Rated-Min.)	KW	8.6-8.2-1.75	11.0-9.965-2.6
	Input(Max.-Rated-Min.)	KW	2.60-2.24-1.05	4.28-2.72-1.3
	Current(Max.-Rated-Min.)	A	12.23-9.32-4.56	21.4-11.83-5.65
	COP		3.66	3.66
Max. input consumption		W	3250	4600
Max. current		A	15.48	23
Compressor	Model		ATL165SD-C9AU	TNB220FLBM1
	Type		Rotary DC Inverter	Rotor DC Inverter
	Brand		HITACHI	MITSUBISHI ELECTRIC
	Capacity	Btu/h	15525	24328
	Input	W	1530	2200
	Rated current(RLA)	A	10.4	9.7
	Thermal protector		-	-
	Capacitor	uF	-	-
	Refrigerant oil	ml	68HES-H,880	MEL 56, 670
Indoor fan motor	Model		YSK55-4L	YSK80-4A
	Type		AC Motor	AC motor
	Input	w	125/105/85	143/122/110
	Capacitor	uF	2.5uF/450V	3.5uF/450V
	Speed(hi/mi/lo)	r/min	1310/1190/1040	1310/1210/1115
Indoor coil	a.Number of rows		3	3
	b.Tube pitch(a)x row pitch(b)	mm	25.4 x 22	25.4 x 22
	c.Fin spacing	mm	1.7	1.7
	d.Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum
	e.Tube outside dia.and type	mm	Φ9.53 Inner groove tube	Φ9.53 Inner groove tube
	f.Coil length x height x width	mm	828x254x66	1118 x 254 x 66
	g.Number of circuits		3	5
Indoor air flow (Hi/Mi/Lo)		m ³ /h	1000/900/700	1200/1000/800
Sound level (sound pressure)		dB(A)	45/43/40	45/43/40
Indoor unit	Dimension (W x H x D)	mm	990 x203 x660	1280 x 203 x 660
	Packing (W x H x D)	mm	1089 x296 x744	1379 x 296 x 744
	Net/Gross weight	kg	29/35	37/42
Outdoor fan motor	Model		YDK53-6Z(×1)	YDK250-6E
	Type		AC MOTOR	AC MOTOR
	Input	W	141.5/92	307/194

	Capacitor	uF	3uF/450V	10uF±5% 450V
	Speed	r/min	815/550	740/530
Outdoor coil	Number of rows		2	2
	Tube pitch(a)x row pitch(b)	mm	25.4 x 22	25.4×22
	Fin spacing	mm	1.5	1.7
	Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum
	Tube outside dia.and type	mm	Φ9.53 Inner grooved copper tube	Φ9.53 Inner grooved copper tube
	Coil length x height x width	mm	758x813x44	876x914.4x44
	Number of circuits		2	4
Outdoor air flow(Hi/Low)		m ³ /h	3000/2850	5000/4800
Sound level(sound pressure)(Hi/Low)		dB(A)	55/48	55/50
Outdoor unit	Dimension(WxDxH)	mm	895x862x313	990×966×354
	Packing (WxDxH)	mm	1043x915x395	1120×1100×435
	Net/Gross weight	kg	73/76	92/100
Refrigerant	Type		R410A	R410A
	Charged volume	g	2300	3350
Throttle type			Electronic expansion valve & Capillary	Electronic expansion valve & Capillary
Design pressure(Hi/Low)		MPa	4.2/2.0	4.2/2.0
Refrigerant piping	Liquid side/ Gas side	mm	9.5/15.9	9.5/15.9
	Max. refrigerant pipe length	m	25	25
	Max. difference in level(Outdoor is up)	m	12	15
	Max. difference in level (Outdoor is down)	m	9	9
Connection wiring	Power wiring (Indoor)	mm ²	3 core x 1.0	3 core x 1.0
	Power wiring (Outdoor)	mm ²	3 core x 2.5	3 core x 2.5
	Signal wiring	mm ²	3-core shielded wire x0.5	3-core shielded wire x0.5
Drainage water pipe dia. (Indoor)		mm	Φ25	Φ25
Wireless remote controller (Indoor)			R05/BGE (standard)	R05/BGE (standard)
Operation temp (Indoor)		℃	17~30	17~30
Ambient temp (Outdoor)		℃	Cooling: -15~43(*) Heating: -15~24	Cooling: -15~43(*) Heating: -15~24

(*) Optional Low Ambient Kit included. Cooling Operation Range without it: 7 to 43°C

Model	Indoor	Model name	CFT 100 INV-Ri	CFT 100 INV-Ri
		Code	220044400310	220044400310
		Power supply	220~240V-1 Ph-50Hz	220~240V-1 Ph-50Hz
	Outdoor	Model name	CFT 100 INV-Ro-1	CFT 100 INV-Ro
		Code	220075500651	220075500920
		Power supply	220~240V-1 Ph-50Hz	380V~3 Ph-50Hz
Cooling	Capacity(Max.-Rated-Min.)	KW	13.2-10.551-3.0	13.2-10.55-3.0
	Input(Max.-Rated-Min.)	KW	5.5-3.25-2.3	4.9-3.27-2.3
	Current(Max.-Rated-Min.)	A	25-14.13-10	7.53-4.72-3.30
	EER		3.25	3.22
Heating	Capacity(Max.-Rated-Min.)	KW	14.0-11.72-3.7	14.0-11.72-3.7
	Input(Max.-Rated-Min.)	KW	5.20-3.20-2.0	3.91-3.23-1.03
	Current(Max.-Rated-Min.)	A	23.64-13.91-8.69	5.98-4.67-1.49
	COP		3.66	3.63
Max. input consumption		W	5500	5000
Max. current		A	25	7.5
Compressor	Model		TNB306FPGM	TNB306FPNM
	Type		Rotor DC Inverter	Rotary DC Inverter
	Brand		MITSUBISHI ELECTRIC	MITSUBISHI ELECTRIC
	Capacity	Btu/h	33642	33710
	Input	W	3080	3010
	Rated current(RLA)	A	13.5	9.3
	Thermal protector		-	-
	Capacitor	uF	-	-
	Refrigerant oil	ml	FV50S, 870	FV50S, 870
Indoor fan motor	Model		YSK80-4A	YSK80-4A
	Type		AC motor	AC motor
	Input	w	143/122/110	143/122/110
	Capacitor	uF	3.5uF/450V	3.5uF/450V
	Speed(hi/mi/lo)	r/min	1310/1210/1115	1310/1210/1115
Indoor coil	a.Number of rows		3	3
	b.Tube pitch(a)x row pitch(b)	mm	25.4 x 22	25.4 x 22
	c.Fin spacing	mm	1.7	1.7
	d.Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum
	e.Tube outside dia.and type	mm	Φ9.53 Inner groove tube	Φ9.53 Inner groove tube
	f.Coil length x height x width	mm	1118 x 254 x 66	1118 x 254 x 66
	g.Number of circuits		5	5
Indoor air flow (Hi/Mi/Lo)		m³/h	1400/1200/1000	1400/1200/1000
Sound level (sound pressure)		dB(A)	45/43/40	45/43/40
Indoor unit	Dimension (W x H x D)	mm	1280 x 203 x 660	1280 x 203 x 660
	Packing (W x H x D)	mm	1379 x 296 x 744	1379 x 296 x 744
	Net/Gross weight	kg	37/42	37/42
Outdoor fan motor	Model		(YDK100-6A)×2	YDK250-6E(×1)
	Type		AC MOTOR	AC Motor
	Input	W	(185/120)×2	307/194
	Capacitor	uF	(3.5uF/450V)×2	10uF±5% 450V

	Speed	r/min	(860/610)×2	740/530
Outdoor coil	Number of rows		2	2
	Tube pitch(a)× row pitch(b)	mm	25.4×22	25.4×22
	Fin spacing	mm	1.5	1.7
	Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum
	Tube outside dia.and type	mm	Φ9.53 Inner grooved copper tube	Φ9.53 Inner grooved copper tube
	Coil length x height x width	mm	887×1220×44	876×914.4×44
	Number of circuits		8	4
Outdoor air flow(Hi/Low)		m ³ /h	6000/5800	5000/4800
Sound level(sound pressure)(Hi/Low)		dB(A)	57/52	55/50
Outdoor unit	Dimension(WxDxH)	mm	940×1245×360	990×966×354
	Packing (WxDxH)	mm	1058×1380×438	1120×1100×435
	Net/Gross weight	kg	106/114	87/95
Refrigerant	Type		R410A	R410A
	Charged volume	g	4100	2900
Throttle type			Electronic expansion valve & Capillary	Electronic expansion valve & Capillary
Design pressure(Hi/Low)		MPa	4.2/2.0	4.2/2.0
Refrigerant piping	Liquid side/ Gas side	mm	9.5/15.9	9.5/15.9
	Max. refrigerant pipe length	m	30	30
	Max. difference in level(Outdoor is up)	m	20	20
	Max. difference in level (Outdoor is down)	m	12	12
Connection wiring	Power wiring (Indoor)	mm ²	3core x 1.0	3×1.0
	Power wiring (Outdoor)	mm ²	3 core x 2.5	5×2.5
	Signal wiring	mm ²	3-core shielded wire x0.5	3-core shield wire 3×0.5
Drainage water pipe dia. (Indoor)		mm	Φ25	Φ25
Wireless remote controller (Indoor)			R05/BGE (standard)	R05/BGE (standard)
Operation temp (Indoor)		℃	17~30	17~30
Ambient temp (Outdoor)		℃	Cooling: -15~43(*) Heating: -15~24	Cooling: -15~43(*) Heating: -15~24

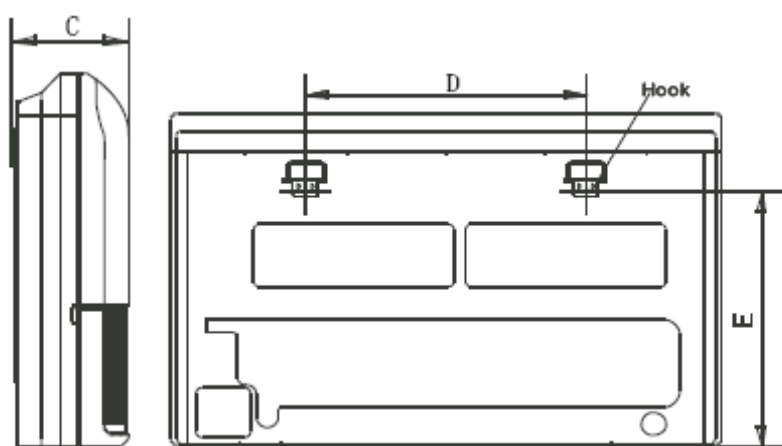
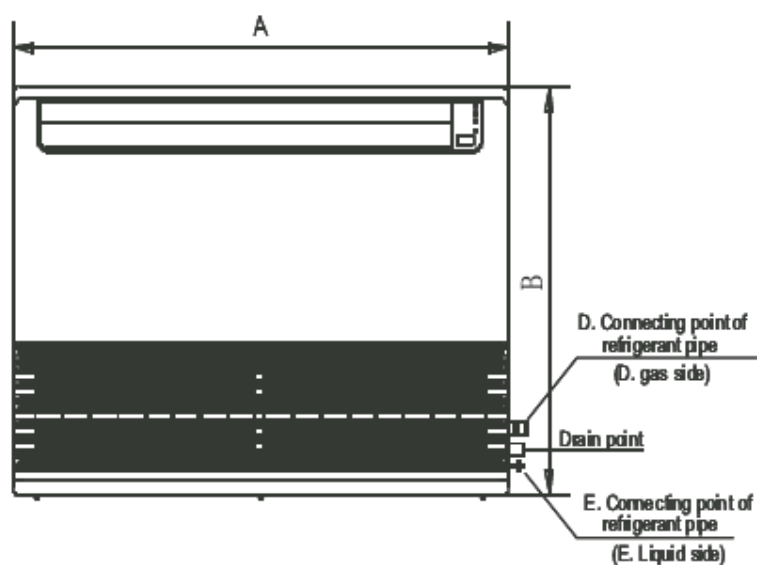
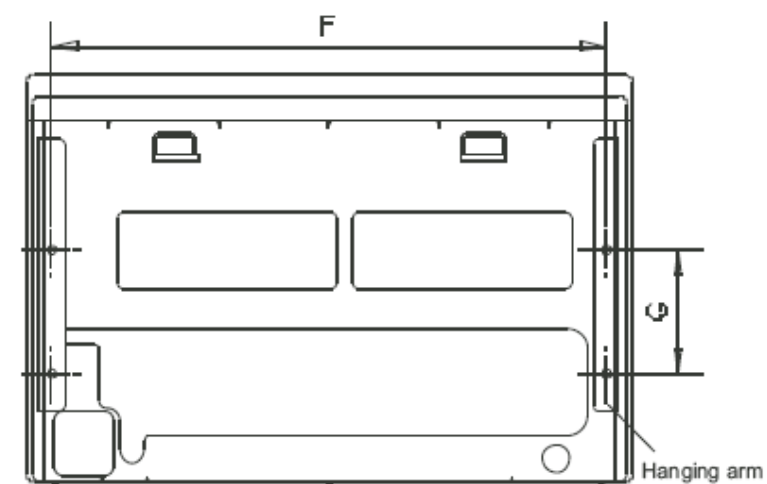
(*) Optional Low Ambient Kit included. Cooling Operation Range without it: 7 to 43℃

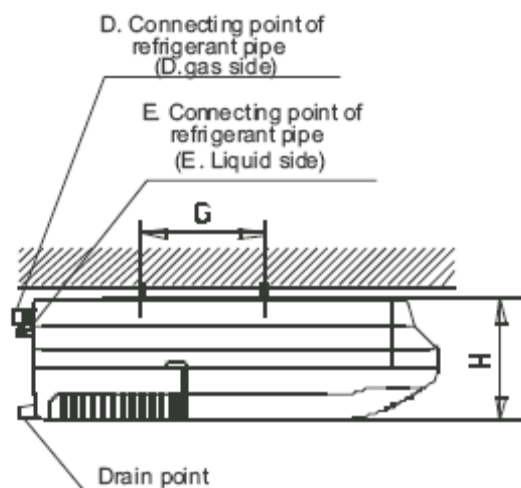
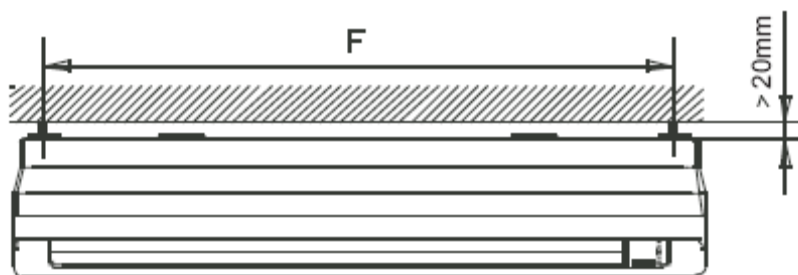
Model	Indoor	Model name	CFT 140 INV-Ri	CFT 140 INV-Ri	CFT 170 INV-Ri
		Code	220044600230	220044600230	220044700210
		Power supply	220~240V-1 Ph-50Hz	220~240V-1 Ph-50Hz	220~240V-1 Ph-50Hz
	Outdoor	Model name	CFT 140 INV-Ro-1	CFT 140 INV-Ro	CFT 170 INV-Ro
		Code	220075700341	220075700690	220075800161
		Power supply	220~240V-1 Ph-50Hz	380V~3 Ph-50Hz	380V~3 Ph-50Hz
Cooling	Capacity(Max.-Rated-Min.)	KW	15.6-14.06-3.6	15.6-14.06-3.4	19.0-17.58-4.25
	Input(Max.-Rated-Min.)	KW	6.0-4.32-2.5	5.95-4.33-2.5	7.5-5.46-3.0
	Current(Max.-Rated-Min.)	A	28-18.78-10.8	8.5-6.27-3.60	11.5-8.3-4.3
	EER		3.26	3.25	3.22
Heating	Capacity(Max.-Rated-Min.)	KW	16.5-15.24-4.2	16.5-15.53-4.2	21.38-20.22-4.8
	Input(Max.-Rated-Min.)	KW	5.59-4.13-2.3	5.51-4.29-1.45	6.28-5.6-1.65
	Current(Max.-Rated-Min.)	A	26.07-17.96-10	8.48-6.19-2.08	9.63-7.06-2.37
	COP		3.69	3.62	3.61
Max. input consumption		W	6000	5500	7500
Max. current		A	28	7.8	11.5
Compressor	Model		TNB306FPGM	TNB306FPNM	ANB42FBEMT
	Type		Rotor DC Inverter	Rotary DC Inverter	Scroll DC Inverter
	Brand		MITSUBISHI ELECTRIC	MITSUBISHI ELECTRIC	SIAM
	Capacity	Btu/h	33642	33710	47440
	Input	W	3080	3010	4160
	Rated current(RLA)	A	13.5	9.3	15.2
	Thermal protector		-	-	-
	Capacitor	uF	-	-	-
	Refrigerant oil	ml	FV50S, 870	FV50S, 870	MEL 56, 1700
Indoor fan motor	Model		(YSK59-4D) x 2	(YSK59-4D) x 2	(YSK59-4D) x 2
	Type		AC motor	AC motor	AC motor
	Input	w	(89.5/81.5/77.5) x2	(89.5/81.5/77.5) x2	(89.5/81.5/77.5) x2
	Capacitor	uF	2.5uF/450V) x2	2.5uF/450V) x2	(2.5uF/450V) x2
	Speed(hi/mi/lo)	r/min	(1170/1070/995) x2	(1170/1070/995) x2	(1170/1070/995) x2
Indoor coil	a.Number of rows		3	3	3
	b.Tube pitch(a)x row pitch(b)	mm	25.4 x 22	25.4 x 22	25.4 x 22
	c.Fin spacing	mm	1.7	1.7	1.7
	d.Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum	Hydrophilic aluminum
	e.Tube outside dia.and type	mm	Φ9.53 Inner groove tube	Φ9.53 Inner groove tube	Φ9.53 Inner groove tube
	f.Coil length x height x width	mm	1384 x 254 x 66	1384 x 254 x 66	1384 x 254 x 66
	g.Number of circuits		5	5	5
Indoor air flow (Hi/Mi/Lo)		m ³ /h	2000/1800/1600	2000/1800/1600	2000/1800/1600
Sound level (sound pressure)		dB(A)	47/46/44	47/46/44	47/46/44
Indoor unit	Dimension (W x H x D)	mm	1670 x 240 x 680	1670 x 240 x 680	1670 x 240 x 680
	Packing (W x H x D)	mm	1764 x 329 x 760	1764 x 329 x 760	1764 x 329 x 760
	Net/Gross weight	kg	52/59	52/59	52/59
Outdoor fan motor	Model		(YDK100-6A)×2	YDK100-6A(×2)	(YDK100-6A)×2
	Type		AC MOTOR	AC Motor	AC MOTOR
	Input	W	(185/120)×2	185/120	(185/120)×2

	Capacitor	uF	(3.5uF/450V)×2	3.5uF/450V	(3.5uF/450V)×2
	Speed	r/min	(860/610)×2	860/610	(860/610)×2
Outdoor coil	Number of rows		2	2	2
	Tube pitch(a)× row pitch(b)	mm	25.4×22	25.4×22	25.4 × 22
	Fin spacing	mm	1.5	1.8	1.8
	Fin type (code)		Hydrophilic aluminum	Hydrophilic aluminum	Hydrophilic aluminum
	Tube outside dia.and type	mm	Φ9.53 Inner grooved copper tube	Φ9.53 Inner grooved copper tube	Φ9.53 Inner grooved copper tube
	Coil length x height x width	mm	887×1220×44	887×1220×44	887×1220×44
	Number of circuits		8	8	4
Outdoor air flow(Hi/Low)		m ³ /h	6000/5800	6000/5800	6000/5800
Sound level(sound pressure)(Hi/Low)		dB(A)	59/54	59/54	59/54
Outdoor unit	Dimension(WxDxH)	mm	940×1245×360	940×1245×360	940×1245×360
	Packing (WxDxH)	mm	1058×1380×438	1058×1380×438	1058×1380×438
	Net/Gross weight	kg	106/114	99/107	115/121
Refrigerant	Type		R410A	R410A	R410A
	Charged volume	g	4450	3600	3850
Throttle type			Electronic expansion valve & Capillary	Electronic expansion valve & Capillary	Electronic expansion valve & Capillary
Design pressure(Hi/Low)		MPa	4.2/2.0	4.2/2.0	4.2/2.0
Refrigerant piping	Liquid side/ Gas side	mm	9.5/15.9	9.5/15.9	9.5/15.9
	Max. refrigerant pipe length	m	50	50	50
	Max. difference in level(Outdoor is up)	m	25	30	30
	Max. difference in level (Outdoor is down)	m	20	20	20
Connection wiring	Power wiring (Indoor)	mm ²	3 core x 1.0	3×1.0	3 core x 1.0
	Power wiring (Outdoor)	mm ²	3 core x 2.5	5×2.5	5 core×2.5
	Signal wiring	mm ²	3-core shielded wire x0.5	3-core shield wire 3×0.5	3-core shielded wire x0.5
Drainage water pipe dia. (Indoor)		mm	Φ25	Φ25	Φ25
Wireless remote controller (Indoor)			R05/BGE (standard)	R05/BGE (standard)	R05/BGE (standard)
Operation temp (Indoor)		℃	17~30	17~30	17~30
Ambient temp (Outdoor)		℃	Cooling: -15~43(*) Heating: -15~24	Cooling: -15~43(*) Heating: -15~24	Cooling: -15~43(*) Heating: -15~24

(*) Optional Low Ambient Kit included. Cooling Operation Range without it: 7 to 43°C

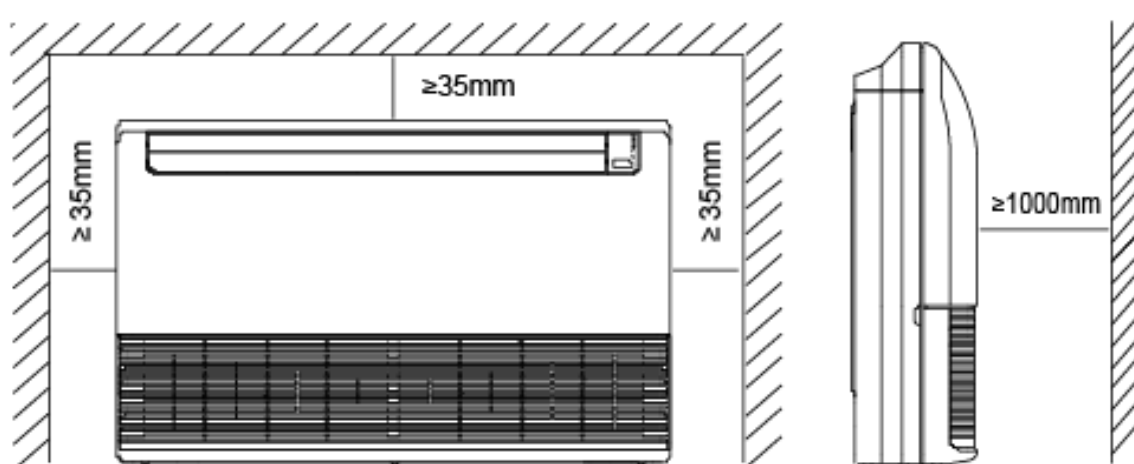
3. Dimensions





Capacity(Btu/h)	A	B	C	D	E	F	G	H
12000-24000Btu/h	990	660	206	505	506	907	200	203
30000-36000Btu/h	1280	660	206	795	506	1195	200	203
48000-60000Btu/h	1670	680	244	1070	450	1542	200	240

4. Service Space



5. Wiring Diagrams

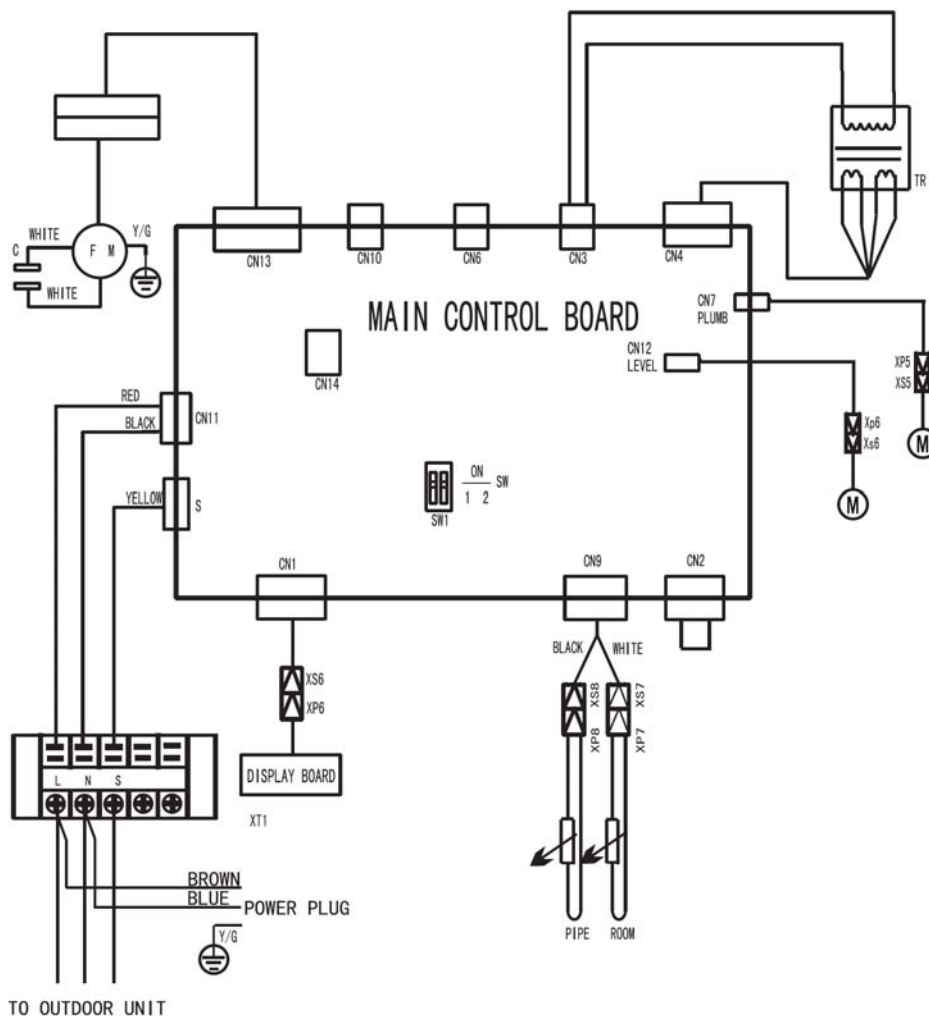
CFT 35 INV-Ri

202044090014

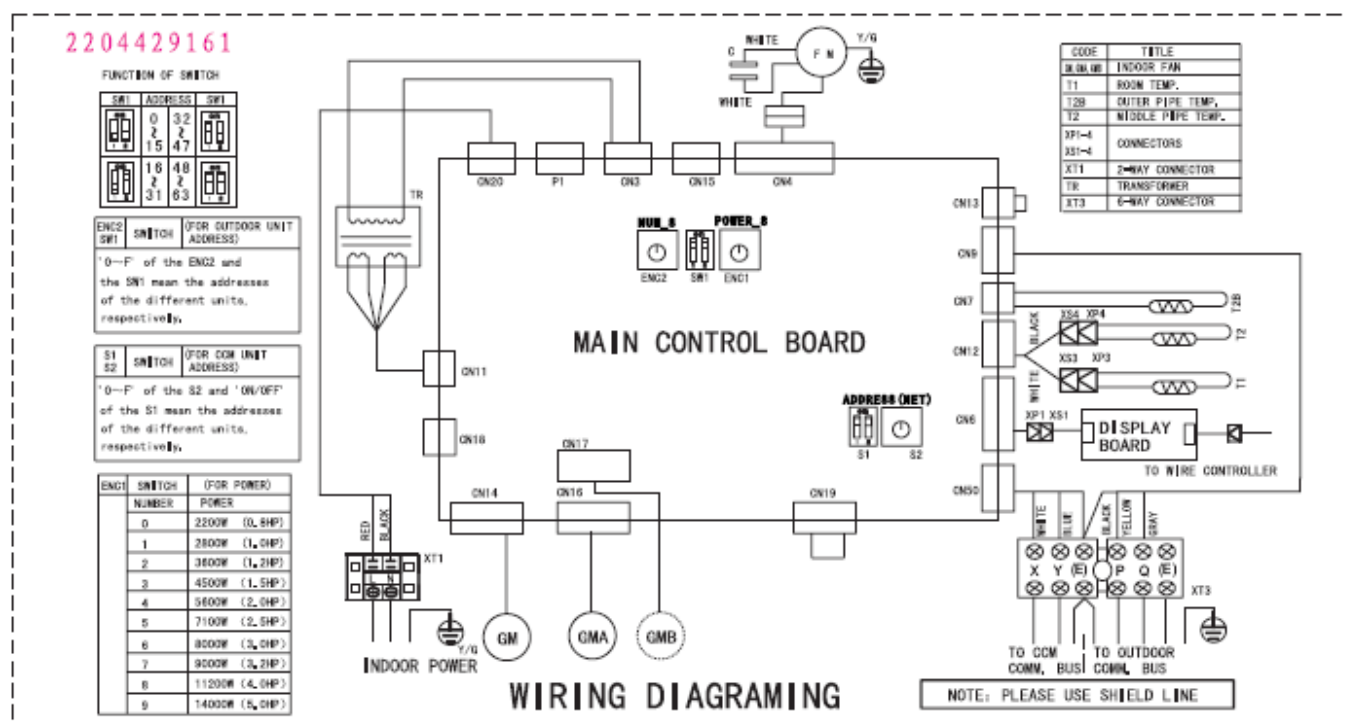
WIRING DIAGRAMING

FUNCTION OF SWITCH	
TEMP. SELECT	
SWITCH	TEMP.
	6
	4
	2
	0

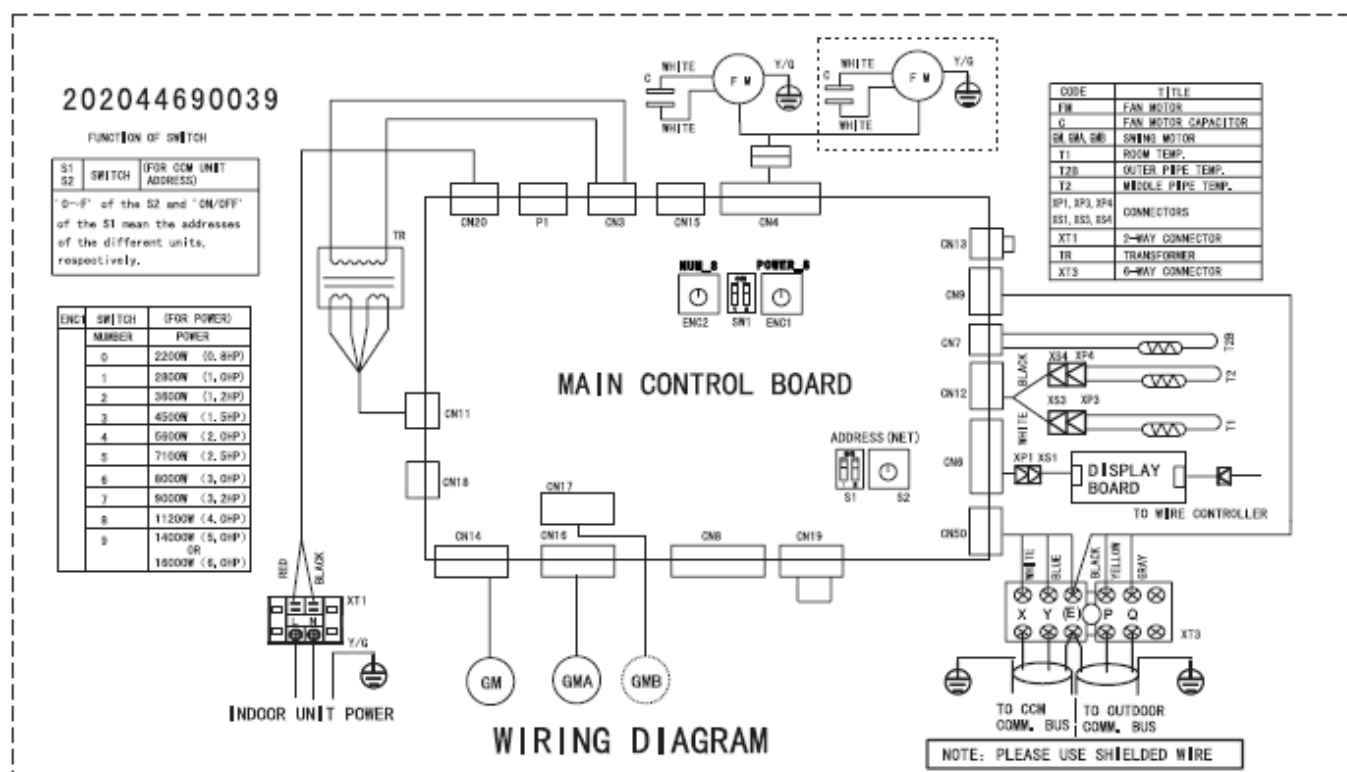
CODE	TITLE
FM	INDOOR FAN
ROOM	ROOM TEMP.
M	SWING MOTOR
PIPE	MIDDLE PIPE TEMP.
XP5-8	CONNECTORS
XS5-8	CONNECTORS
XT1	5-WAY CONNECTOR
TR	TRANSFORMER



CFT 50 INV-Ri, CFT 70 INV-Ri



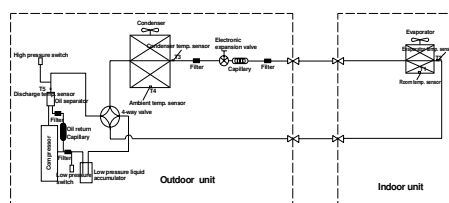
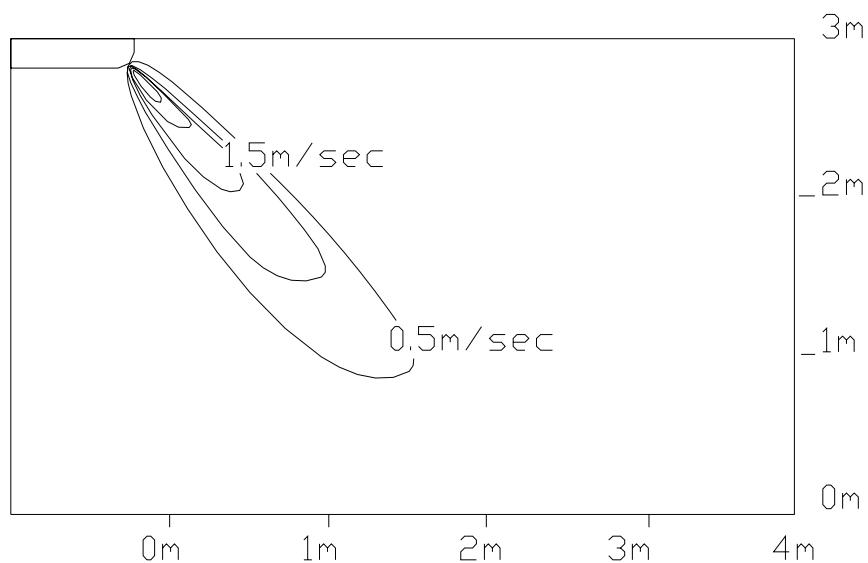
CFT 90 INV-Ri, CFT 100 INV-Ri, CFT 140 INV-Ri, CFT 170 INV-Ri



6. Air Velocity and Temperature Distributions

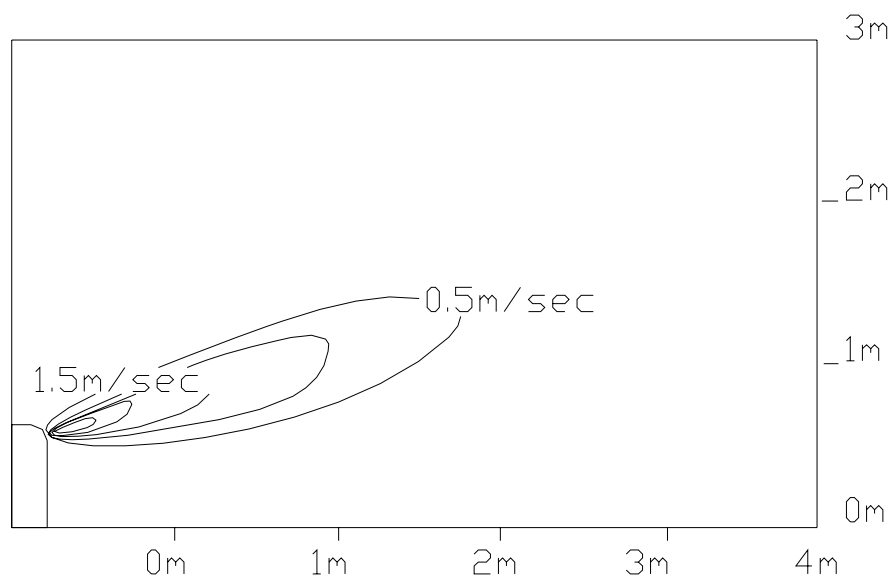
Discharge angle 60° (CEILING)

Airflow velocity

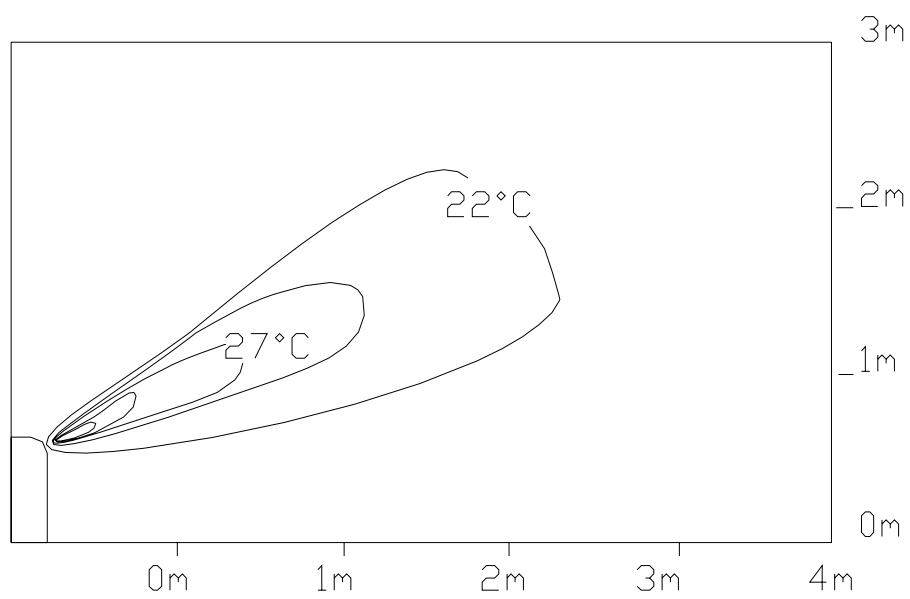


Discharge angle 60° (FLOOR)

Airflow velocity



Temperature



7. Capacity Tables

CFT 35 INV-Ri Cooling

Outdoor temperature(°C DB)	Indoor temperature(°C WB)													
	14.00		16.00		18.00		19.00		20.00		22.00		24.00	
	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
10.00	2.22	0.33	2.72	0.41	3.22	0.49	3.52	0.53	3.68	0.58	3.76	0.58	3.83	0.58
12.00	2.22	0.34	2.72	0.42	3.22	0.50	3.52	0.54	3.68	0.59	3.76	0.59	3.83	0.59
14.00	2.22	0.34	2.72	0.43	3.22	0.51	3.52	0.55	3.68	0.60	3.76	0.60	3.83	0.61
16.00	2.22	0.35	2.72	0.43	3.22	0.52	3.52	0.56	3.68	0.61	3.76	0.61	3.83	0.62
18.00	2.22	0.35	2.72	0.44	3.22	0.53	3.52	0.57	3.68	0.62	3.76	0.62	3.83	0.63
19.00	2.22	0.36	2.72	0.45	3.22	0.54	3.52	0.58	3.68	0.63	3.76	0.63	3.83	0.64
21.00	2.22	0.39	2.72	0.48	3.22	0.58	3.52	0.63	3.68	0.68	3.76	0.68	3.83	0.68
23.00	2.22	0.41	2.72	0.52	3.22	0.62	3.52	0.67	3.68	0.72	3.76	0.73	3.83	0.73
25.00	2.22	0.44	2.72	0.55	3.22	0.66	3.52	0.72	3.68	0.77	3.76	0.78	3.83	0.78
27.00	2.22	0.47	2.72	0.59	3.22	0.71	3.52	0.77	3.68	0.83	3.76	0.83	3.83	0.84
29.00	2.22	0.51	2.72	0.63	3.22	0.76	3.52	0.82	3.68	0.88	3.76	0.89	3.83	0.89
31.00	2.22	0.54	2.72	0.67	3.22	0.81	3.52	0.87	3.68	0.94	3.76	0.94	3.83	0.95
33.00	2.22	0.58	2.72	0.72	3.22	0.86	3.52	0.97	3.68	1.00	3.76	1.01	3.83	1.02
35.00	2.22	0.61	2.72	0.76	3.22	0.91	3.52	1.09	3.68	1.07	3.76	1.07	3.83	1.08
37.00	2.22	0.65	2.72	0.81	3.22	0.97	3.52	1.11	3.68	1.14	3.76	1.14	3.83	1.15
39.00	2.22	0.65	2.72	0.81	3.22	0.98	3.52	1.13	3.68	1.14	3.76	1.14	3.83	1.15
41.00	2.22	0.66	2.72	0.82	3.22	0.98	3.52	1.14	3.68	1.15	3.76	1.15	3.83	1.16
43.00	2.22	0.66	2.72	0.82	3.22	0.98	3.52	1.14	3.68	1.15	3.76	1.15	3.83	1.17

Heating

Outdoor air temp.		Indoor temperature(°C DB)											
		16		18		20		21		22		24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
-14.7	-15	2.54	0.88	2.54	0.90	2.54	0.91	2.44	0.87	2.34	0.83	2.14	0.75
-12.6	-13	2.68	0.89	2.68	0.91	2.68	0.93	2.57	0.89	2.47	0.85	2.26	0.77
-10.5	-11	2.82	0.91	2.82	0.92	2.82	0.94	2.71	0.90	2.60	0.86	2.37	0.78
-9.5	-10	2.89	0.91	2.89	0.93	2.89	0.95	2.77	0.91	2.66	0.87	2.43	0.78
-8.5	-9.1	2.96	0.92	2.96	0.94	2.96	0.96	2.84	0.92	2.72	0.87	2.49	0.79
-7	-7.6	3.06	0.93	3.06	0.95	3.06	0.97	2.94	0.93	2.82	0.88	2.57	0.80
-5	-5.6	3.19	0.94	3.19	0.96	3.19	0.98	3.07	0.94	2.94	0.90	2.69	0.81
-3	-3.7	3.33	0.96	3.33	0.98	3.33	1.00	3.20	0.95	3.06	0.91	2.80	0.82
0	-0.7	3.53	0.98	3.53	1.00	3.53	1.02	3.39	0.97	3.25	0.93	2.97	0.84
3	2.2	3.73	1.00	3.73	1.02	3.73	1.04	3.58	1.00	3.43	0.95	3.14	0.86
5	4.1	3.87	1.01	3.87	1.03	3.87	1.06	3.71	1.01	3.56	0.96	3.25	0.87
7	6	4.00	1.03	4.00	1.05	4.00	1.07	3.84	1.02	3.68	0.98	3.37	0.88
9	7.9	4.00	0.99	4.00	1.01	4.00	1.03	3.84	0.99	3.68	0.94	3.37	0.85
11	9.8	4.00	0.96	4.00	0.98	4.00	1.00	3.84	0.95	3.68	0.91	3.37	0.82
13	11.8	4.00	0.92	4.00	0.94	4.00	0.96	3.84	0.92	3.68	0.88	3.37	0.79
15	13.7	4.00	0.89	4.00	0.91	4.00	0.93	3.84	0.89	3.68	0.85	3.37	0.76

**CFT 50 INV-Ri
Cooling**

Outdoor temperature(°C DB)		Indoor temperature(°C WB)													
		14.00		16.00		18.00		19.00		20.00		22.00		24.00	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
10.00		3.65	0.54	4.31	0.68	4.97	0.81	5.28	0.88	5.57	0.95	5.69	0.95	5.82	0.96
12.00		3.65	0.55	4.31	0.69	4.97	0.83	5.28	0.90	5.57	0.97	5.69	0.97	5.82	0.98
14.00		3.65	0.56	4.31	0.70	4.97	0.84	5.28	0.91	5.57	0.98	5.69	0.99	5.82	1.00
16.00		3.65	0.57	4.31	0.72	4.97	0.86	5.28	0.93	5.57	1.00	5.69	1.00	5.82	1.01
18.00		3.65	0.58	4.31	0.73	4.97	0.87	5.28	0.95	5.57	1.02	5.69	1.02	5.82	1.03
19.00		3.65	0.59	4.31	0.74	4.97	0.89	5.28	0.96	5.57	1.04	5.69	1.04	5.82	1.05
21.00		3.65	0.64	4.31	0.79	4.97	0.95	5.28	1.03	5.57	1.11	5.69	1.11	5.82	1.13
23.00		3.65	0.68	4.31	0.85	4.97	1.02	5.28	1.10	5.57	1.19	5.69	1.19	5.82	1.21
25.00		3.65	0.73	4.31	0.91	4.97	1.09	5.28	1.18	5.57	1.27	5.69	1.28	5.82	1.29
27.00		3.65	0.78	4.31	0.97	4.97	1.16	5.28	1.26	5.57	1.36	5.69	1.37	5.82	1.38
29.00		3.65	0.83	4.31	1.04	4.97	1.24	5.28	1.35	5.57	1.45	5.69	1.46	5.82	1.47
31.00		3.65	0.89	4.31	1.11	4.97	1.33	5.28	1.44	5.57	1.55	5.69	1.56	5.82	1.57
33.00		3.65	0.95	4.31	1.18	4.97	1.41	5.28	1.53	5.57	1.65	5.69	1.66	5.82	1.67
35.00		3.65	1.01	4.31	1.26	4.97	1.50	5.28	1.63	5.57	1.76	5.69	1.76	5.82	1.78
37.00		3.65	1.07	4.31	1.33	4.97	1.60	5.28	1.73	5.57	1.87	5.69	1.87	5.82	1.89
39.00		3.65	1.08	4.31	1.34	4.97	1.61	5.28	1.74	5.57	1.88	5.69	1.88	5.82	1.90
41.00		3.65	1.08	4.31	1.35	4.97	1.61	5.28	1.75	5.57	1.89	5.69	1.89	5.82	1.91
43.00		3.65	1.09	4.31	1.35	4.97	1.62	5.28	1.76	5.57	1.89	5.69	1.90	5.82	1.92

Heating

Outdoor air temp.		Indoor temperature(°C DB)											
		16		18		20		21		22		24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
-14.7	-15	3.72	1.30	3.72	1.33	3.72	1.36	3.57	1.30	3.43	1.24	3.13	1.12
-12.6	-13	3.93	1.32	3.93	1.35	3.93	1.38	3.77	1.32	3.62	1.26	3.30	1.14
-10.5	-11	4.13	1.35	4.13	1.37	4.13	1.40	3.97	1.34	3.81	1.28	3.48	1.16
-9.5	-10	4.23	1.36	4.23	1.38	4.23	1.41	4.07	1.35	3.90	1.29	3.56	1.17
-8.5	-9.1	4.33	1.37	4.33	1.40	4.33	1.42	4.16	1.36	3.99	1.30	3.64	1.17
-7	-7.6	4.48	1.38	4.48	1.41	4.48	1.44	4.30	1.38	4.12	1.31	3.77	1.19
-5	-5.6	4.68	1.40	4.68	1.43	4.68	1.46	4.49	1.40	4.31	1.33	3.93	1.21
-3	-3.7	4.87	1.42	4.87	1.45	4.87	1.48	4.68	1.42	4.49	1.35	4.10	1.22
0	-0.7	5.17	1.45	5.17	1.48	5.17	1.52	4.96	1.45	4.76	1.38	4.35	1.25
3	2.2	5.47	1.48	5.47	1.52	5.47	1.55	5.25	1.48	5.03	1.41	4.60	1.28
5	4.1	5.66	1.50	5.66	1.54	5.66	1.57	5.44	1.50	5.21	1.43	4.76	1.29
7	6	5.86	1.52	5.86	1.56	5.86	1.59	5.63	1.52	5.39	1.45	4.93	1.31
9	7.9	5.86	1.47	5.86	1.51	5.86	1.54	5.63	1.47	5.39	1.40	4.93	1.27
11	9.8	5.86	1.42	5.86	1.45	5.86	1.48	5.63	1.42	5.39	1.35	4.93	1.22
13	11.8	5.86	1.37	5.86	1.40	5.86	1.43	5.63	1.37	5.39	1.30	4.93	1.18
15	13.7	5.86	1.32	5.86	1.35	5.86	1.38	5.63	1.32	5.39	1.26	4.93	1.14

**CFT 70 INV-Ri
Cooling**

Outdoor temperature(°C DB)		Indoor temperature(°C WB)													
		14.00		16.00		18.00		19.00		20.00		22.00		24.00	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
10.00		4.87	0.73	5.75	0.91	6.63	1.09	7.03	1.18	7.44	1.27	7.60	1.27	7.76	1.29
12.00		4.87	0.74	5.75	0.92	6.63	1.11	7.03	1.20	7.44	1.29	7.60	1.30	7.76	1.31
14.00		4.87	0.75	5.75	0.94	6.63	1.13	7.03	1.22	7.44	1.32	7.60	1.32	7.76	1.33
16.00		4.87	0.77	5.75	0.96	6.63	1.15	7.03	1.24	7.44	1.34	7.60	1.34	7.76	1.36
18.00		4.87	0.78	5.75	0.97	6.63	1.17	7.03	1.26	7.44	1.36	7.60	1.37	7.76	1.38
19.00		4.87	0.79	5.75	0.99	6.63	1.19	7.03	1.29	7.44	1.39	7.60	1.39	7.76	1.40
21.00		4.87	0.85	5.75	1.06	6.63	1.27	7.03	1.38	7.44	1.49	7.60	1.49	7.76	1.51
23.00		4.87	0.91	5.75	1.14	6.63	1.36	7.03	1.48	7.44	1.59	7.60	1.60	7.76	1.61
25.00		4.87	0.98	5.75	1.22	6.63	1.46	7.03	1.58	7.44	1.70	7.60	1.71	7.76	1.73
27.00		4.87	1.04	5.75	1.30	6.63	1.56	7.03	1.69	7.44	1.82	7.60	1.83	7.76	1.84
29.00		4.87	1.11	5.75	1.39	6.63	1.66	7.03	1.80	7.44	1.94	7.60	1.95	7.76	1.97
31.00		4.87	1.19	5.75	1.48	6.63	1.77	7.03	1.92	7.44	2.07	7.60	2.08	7.76	2.10
33.00		4.87	1.27	5.75	1.58	6.63	1.89	7.03	2.05	7.44	2.21	7.60	2.22	7.76	2.24
35.00		4.87	1.35	5.75	1.68	6.63	2.01	7.03	2.18	7.44	2.35	7.60	2.36	7.76	2.38
37.00		4.87	1.43	5.75	1.79	6.63	2.14	7.03	2.32	7.44	2.50	7.60	2.51	7.76	2.53
39.00		4.87	1.44	5.75	1.79	6.63	2.15	7.03	2.33	7.44	2.51	7.60	2.52	7.76	2.54
41.00		4.87	1.45	5.75	1.80	6.63	2.16	7.03	2.34	7.44	2.52	7.60	2.53	7.76	2.55
43.00		4.87	1.45	5.75	1.81	6.63	2.17	7.03	2.35	7.44	2.53	7.60	2.54	7.76	2.57

Heating

Outdoor air temp.		Indoor temperature(°C DB)											
		16		18		20		21		22		24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
-14.7	-15	4.93	1.74	4.93	1.77	4.93	1.81	4.73	1.73	4.54	1.65	4.15	1.49
-12.6	-13	5.20	1.77	5.20	1.80	5.20	1.84	5.00	1.76	4.79	1.68	4.38	1.52
-10.5	-11	5.48	1.79	5.48	1.83	5.48	1.87	5.26	1.79	5.04	1.71	4.61	1.54
-9.5	-10	5.61	1.81	5.61	1.85	5.61	1.88	5.39	1.80	5.16	1.72	4.72	1.55
-8.5	-9.1	5.74	1.82	5.74	1.86	5.74	1.90	5.51	1.82	5.28	1.73	4.83	1.57
-7	-7.6	5.94	1.84	5.94	1.88	5.94	1.92	5.70	1.84	5.46	1.75	4.99	1.58
-5	-5.6	6.20	1.87	6.20	1.91	6.20	1.95	5.95	1.86	5.71	1.78	5.21	1.61
-3	-3.7	6.46	1.90	6.46	1.94	6.46	1.98	6.20	1.89	5.95	1.80	5.43	1.63
0	-0.7	6.90	1.94	6.90	1.98	6.90	2.02	6.78	1.93	6.41	1.84	5.76	1.67
3	2.2	7.37	1.98	7.37	2.02	7.37	2.06	6.96	1.97	6.67	1.88	6.09	1.70
5	4.1	7.83	2.01	7.83	2.05	7.83	2.13	7.41	2.00	6.98	1.91	6.31	1.72
7	6	8.21	2.03	8.21	2.12	8.21	2.24	7.86	2.09	7.35	1.93	6.63	1.75
9	7.9	8.21	1.96	8.21	2.01	8.21	2.14	7.86	1.96	7.35	1.87	6.63	1.69
11	9.8	8.21	1.90	8.21	1.94	8.21	1.98	7.86	1.89	7.35	1.80	6.63	1.63
13	11.8	8.21	1.83	8.21	1.87	8.21	1.91	7.86	1.82	7.35	1.74	6.63	1.57
15	13.7	8.21	1.76	8.21	1.80	8.21	1.84	7.86	1.75	7.35	1.67	6.63	1.51

CFT 100 INV-Ri (3 Phase)
Cooling

Outdoor temperature(°C DB)		Indoor temperature(°C WB)													
		14.00		16.00		18.00		19.00		20.00		22.00		24.00	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
10.00		7.27	1.09	8.58	1.36	9.90	1.62	10.55	1.76	11.10	1.90	11.35	1.90	11.59	1.92
12.00		7.27	1.11	8.58	1.38	9.90	1.65	10.55	1.79	11.10	1.93	11.35	1.94	11.59	1.96
14.00		7.27	1.13	8.58	1.41	9.90	1.68	10.55	1.83	11.10	1.97	11.35	1.97	11.59	1.99
16.00		7.27	1.15	8.58	1.43	9.90	1.71	10.55	1.86	11.10	2.00	11.35	2.01	11.59	2.03
18.00		7.27	1.17	8.58	1.46	9.90	1.74	10.55	1.89	11.10	2.04	11.35	2.04	11.59	2.06
19.00		7.27	1.19	8.58	1.48	9.90	1.77	10.55	1.92	11.10	2.07	11.35	2.08	11.59	2.10
21.00		7.27	1.27	8.58	1.59	9.90	1.90	10.55	2.06	11.10	2.22	11.35	2.23	11.59	2.25
23.00		7.27	1.36	8.58	1.70	9.90	2.04	10.55	2.21	11.10	2.38	11.35	2.39	11.59	2.41
25.00		7.27	1.46	8.58	1.82	9.90	2.18	10.55	2.36	11.10	2.55	11.35	2.56	11.59	2.58
27.00		7.27	1.56	8.58	1.95	9.90	2.33	10.55	2.53	11.10	2.72	11.35	2.73	11.59	2.76
29.00		7.27	1.67	8.58	2.08	9.90	2.49	10.55	2.70	11.10	2.91	11.35	2.92	11.59	2.95
31.00		7.27	1.78	8.58	2.22	9.90	2.65	10.55	2.88	11.10	3.10	11.35	3.11	11.59	3.14
33.00		7.27	1.89	8.58	2.36	9.90	2.83	10.55	3.06	11.10	3.30	11.35	3.31	11.59	3.35
35.00		7.27	2.01	8.58	2.51	9.90	3.01	10.55	3.27	11.10	3.51	11.35	3.53	11.59	3.56
37.00		7.27	2.14	8.58	2.67	9.90	3.20	10.55	3.47	11.10	3.74	11.35	3.75	11.59	3.79
39.00		7.27	2.15	8.58	2.68	9.90	3.21	10.55	3.48	11.10	3.75	11.35	3.77	11.59	3.80
41.00		7.27	2.16	8.58	2.69	9.90	3.23	10.55	3.50	11.10	3.77	11.35	3.78	11.59	3.82
43.00		7.27	2.17	8.58	2.71	9.90	3.24	10.55	3.51	11.10	3.79	11.35	3.80	11.59	3.84

Heating

Outdoor air temp.		Indoor temperature(°C DB)											
		16		18		20		21		22		24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
-14.7	-15	7.00	2.48	7.00	2.54	7.00	2.59	6.72	2.47	6.44	2.36	5.89	2.13
-12.6	-13	7.39	2.52	7.39	2.58	7.39	2.63	7.10	2.52	6.80	2.40	6.22	2.17
-10.5	-11	7.78	2.56	7.78	2.62	7.78	2.67	7.47	2.56	7.16	2.44	6.54	2.21
-9.5	-10	7.96	2.58	7.96	2.64	7.96	2.69	7.65	2.58	7.33	2.46	6.70	2.22
-8.5	-9.1	8.15	2.60	8.15	2.66	8.15	2.71	7.83	2.60	7.50	2.48	6.86	2.24
-7	-7.6	8.43	2.63	8.43	2.69	8.43	2.74	8.09	2.62	7.76	2.50	7.09	2.26
-5	-5.6	8.80	2.67	8.80	2.73	8.80	2.79	8.45	2.66	8.10	2.54	7.40	2.30
-3	-3.7	9.17	2.71	9.17	2.77	9.17	2.83	8.81	2.70	8.44	2.58	7.71	2.33
0	-0.7	9.73	2.77	9.73	2.83	9.73	2.89	9.34	2.76	8.95	2.63	8.18	2.38
3	2.2	10.28	2.83	10.28	2.89	10.28	2.95	9.88	2.82	9.47	2.69	8.65	2.43
5	4.1	10.85	2.87	10.85	2.93	10.85	2.99	10.23	2.86	9.81	2.73	8.96	2.47
7	6	11.72	2.91	11.72	2.97	11.72	3.23	10.59	2.90	10.15	2.76	9.28	2.50
9	7.9	11.72	2.81	11.72	2.87	11.72	3.03	10.59	2.80	10.15	2.67	9.28	2.42
11	9.8	11.72	2.71	11.72	2.77	11.72	2.83	10.59	2.70	10.15	2.58	9.28	2.33
13	11.8	11.72	2.61	11.72	2.67	11.72	2.72	10.59	2.61	10.15	2.49	9.28	2.25
15	13.7	11.72	2.52	11.72	2.57	11.72	2.62	10.59	2.51	10.15	2.39	9.28	2.16

CFT 140 INV-Ri (3 Phase)
Cooling

Outdoor temperature(°C DB)	Indoor temperature(°C WB)													
	14.00		16.00		18.00		19.00		20.00		22.00		24.00	
	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
10.00	9.70	1.45	11.45	1.80	13.20	2.16	14.06	2.34	14.81	2.52	15.13	2.53	15.45	2.55
12.00	9.70	1.47	11.45	1.83	13.20	2.20	14.06	2.38	14.81	2.57	15.13	2.58	15.45	2.60
14.00	9.70	1.50	11.45	1.87	13.20	2.24	14.06	2.42	14.81	2.61	15.13	2.62	15.45	2.65
16.00	9.70	1.53	11.45	1.90	13.20	2.28	14.06	2.47	14.81	2.66	15.13	2.67	15.45	2.69
18.00	9.70	1.55	11.45	1.93	13.20	2.32	14.06	2.51	14.81	2.71	15.13	2.72	15.45	2.74
19.00	9.70	1.58	11.45	1.97	13.20	2.36	14.06	2.55	14.81	2.75	15.13	2.76	15.45	2.79
21.00	9.70	1.69	11.45	2.11	13.20	2.53	14.06	2.74	14.81	2.95	15.13	2.96	15.45	2.99
23.00	9.70	1.81	11.45	2.26	13.20	2.70	14.06	2.93	14.81	3.16	15.13	3.17	15.45	3.20
25.00	9.70	1.94	11.45	2.42	13.20	2.89	14.06	3.14	14.81	3.38	15.13	3.39	15.45	3.43
27.00	9.70	2.07	11.45	2.58	13.20	3.09	14.06	3.36	14.81	3.62	15.13	3.63	15.45	3.66
29.00	9.70	2.21	11.45	2.76	13.20	3.30	14.06	3.58	14.81	3.86	15.13	3.87	15.45	3.91
31.00	9.70	2.36	11.45	2.94	13.20	3.52	14.06	3.82	14.81	4.12	15.13	4.13	15.45	4.17
33.00	9.70	2.52	11.45	3.13	13.20	3.75	14.06	4.07	14.81	4.39	15.13	4.40	15.45	4.44
35.00	9.70	2.68	11.45	3.33	13.20	3.99	14.06	4.33	14.81	4.67	15.13	4.68	15.45	4.73
37.00	9.70	2.85	11.45	3.55	13.20	4.25	14.06	4.61	14.81	4.96	15.13	4.98	15.45	5.03
39.00	9.70	2.86	11.45	3.56	13.20	4.26	14.06	4.63	14.81	4.99	15.13	5.00	15.45	5.05
41.00	9.70	2.87	11.45	3.58	13.20	4.28	14.06	4.65	14.81	5.01	15.13	5.02	15.45	5.07
43.00	9.70	2.88	11.45	3.59	13.20	4.30	14.06	4.67	14.81	5.03	15.13	5.05	15.45	5.10

Heating

Outdoor air temp.		Indoor temperature(°C DB)											
		16		18		20		21		22		24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
-14.7	-15	9.82	3.50	9.82	3.57	9.82	3.65	9.43	3.49	9.04	3.33	8.26	3.01
-12.6	-13	10.37	3.56	10.37	3.63	10.37	3.71	9.96	3.55	9.55	3.38	8.72	3.06
-10.5	-11	10.92	3.61	10.92	3.69	10.92	3.77	10.48	3.60	10.05	3.44	9.18	3.11
-9.5	-10	11.18	3.64	11.18	3.72	11.18	3.80	10.73	3.63	10.29	3.46	9.40	3.13
-8.5	-9.1	11.44	3.67	11.44	3.75	11.44	3.83	10.98	3.66	10.53	3.49	9.62	3.15
-7	-7.6	11.83	3.71	11.83	3.79	11.83	3.87	11.36	3.70	10.89	3.53	9.95	3.19
-5	-5.6	12.35	3.77	12.35	3.85	12.35	3.93	11.86	3.75	11.37	3.58	10.39	3.24
-3	-3.7	12.87	3.82	12.87	3.90	12.87	3.98	12.36	3.81	11.85	3.63	10.82	3.29
0	-0.7	13.65	3.90	13.65	3.99	13.65	4.07	13.11	3.89	12.56	3.71	11.48	3.36
3	2.2	14.43	3.99	14.43	4.07	14.43	4.16	13.86	3.97	13.28	3.79	12.14	3.43
5	4.1	14.95	4.04	14.95	4.13	14.95	4.21	14.36	4.03	13.76	3.84	12.58	3.47
7	6	15.53	4.10	15.53	4.18	15.53	4.29	14.86	4.08	14.24	3.90	13.01	3.52
9	7.9	15.53	3.96	15.53	4.04	15.53	4.13	14.86	3.95	14.24	3.77	13.01	3.40
11	9.8	15.53	3.82	15.53	3.90	15.53	3.98	14.86	3.81	14.24	3.63	13.01	3.29
13	11.8	15.53	3.68	15.53	3.76	15.53	3.84	14.86	3.67	14.24	3.50	13.01	3.17
15	13.7	15.53	3.55	15.53	3.62	15.53	3.70	14.86	3.53	14.24	3.37	13.01	3.05

CFT 170 INV-Ri
Cooling

Outdoor temperature(°C DB)		Indoor temperature(°C WB)													
		14.00		16.00		18.00		19.00		20.00		22.00		24.00	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
		kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
10.00		12.17	1.51	14.37	1.88	16.57	2.25	17.58	2.44	18.59	2.63	19.00	2.64	19.40	2.67
12.00		12.17	1.60	14.37	2.00	16.57	2.39	17.58	2.60	18.59	2.80	19.00	2.81	19.40	2.84
14.00		12.17	1.71	14.37	2.13	16.57	2.55	17.58	2.76	18.59	2.98	19.00	2.99	19.40	3.02
16.00		12.17	1.82	14.37	2.27	16.57	2.71	17.58	2.94	18.59	3.17	19.00	3.18	19.40	3.21
18.00		12.17	1.93	14.37	2.41	16.57	2.88	17.58	3.13	18.59	3.37	19.00	3.38	19.40	3.42
19.00		12.17	2.05	14.37	2.56	16.57	3.07	17.58	3.33	18.59	3.59	19.00	3.60	19.40	3.63
21.00		12.17	2.19	14.37	2.73	16.57	3.26	17.58	3.54	18.59	3.82	19.00	3.82	19.40	3.87
23.00		12.17	2.33	14.37	2.90	16.57	3.47	17.58	3.77	18.59	4.06	19.00	4.07	19.40	4.11
25.00		12.17	2.47	14.37	3.09	16.57	3.69	17.58	4.01	18.59	4.32	19.00	4.33	19.40	4.38
27.00		12.17	2.63	14.37	3.28	16.57	3.93	17.58	4.26	18.59	4.60	19.00	4.60	19.40	4.66
29.00		12.17	2.80	14.37	3.49	16.57	4.18	17.58	4.53	18.59	4.89	19.00	4.90	19.40	4.95
31.00		12.17	2.98	14.37	3.72	16.57	4.44	17.58	4.82	18.59	5.20	19.00	5.21	19.40	5.27
33.00		12.17	3.17	14.37	3.95	16.57	4.73	17.58	5.13	18.59	5.53	19.00	5.54	19.40	5.60
35.00		12.17	3.37	14.37	4.21	16.57	5.03	17.58	5.46	18.59	5.89	19.00	5.90	19.40	5.97
37.00		12.17	3.44	14.37	4.29	16.57	5.13	17.58	5.57	18.59	6.01	19.00	6.02	19.40	6.08
39.00		12.17	3.51	14.37	4.38	16.57	5.23	17.58	5.68	18.59	6.13	19.00	6.14	19.40	6.21
41.00		12.17	3.58	14.37	4.46	16.57	5.34	17.58	5.79	18.59	6.25	19.00	6.26	19.40	6.33
43.00		12.17	3.65	14.37	4.55	16.57	5.45	17.58	5.91	18.59	6.37	19.00	6.39	19.40	6.46

Heating

Outdoor air temp.		Indoor temperature(°C DB)											
		16		18		20		21		22		24	
		TC	PI	TC	PI	TC	PI	TC	PI	TC	PI	TC	PI
°C DB	°C WB	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW	kW
-14.7	-15	12.83	4.58	12.83	4.68	12.83	4.77	12.32	4.57	11.83	4.35	10.80	3.94
-12.6	-13	13.56	4.64	13.56	4.74	13.56	4.84	13.01	4.64	12.49	4.42	11.41	4.00
-10.5	-11	14.27	4.71	14.27	4.81	14.27	4.91	13.70	4.70	13.15	4.48	12.01	4.06
-9.5	-10	14.60	4.78	14.60	4.88	14.60	4.99	14.02	4.77	13.46	4.55	12.29	4.12
-8.5	-9.1	14.95	4.85	14.95	4.96	14.95	5.06	14.35	4.84	13.78	4.61	12.58	4.18
-7	-7.6	15.45	4.92	15.45	5.03	15.45	5.13	14.83	4.91	14.24	4.68	13.00	4.24
-5	-5.6	16.14	4.99	16.14	5.10	16.14	5.21	15.50	4.98	14.88	4.75	13.58	4.30
-3	-3.7	16.82	5.07	16.82	5.18	16.82	5.28	16.15	5.06	15.50	4.82	14.15	4.36
0	-0.7	17.84	5.14	17.84	5.25	17.84	5.36	17.13	5.13	16.44	4.89	15.01	4.43
3	2.2	18.86	5.22	18.86	5.33	18.86	5.44	18.11	5.21	17.39	4.96	15.87	4.49
5	4.1	19.54	5.29	19.54	5.41	19.54	5.52	18.76	5.28	18.01	5.03	16.44	4.56
7	6	20.22	5.37	20.22	5.49	20.22	5.60	19.41	5.36	18.63	5.11	17.01	4.62
9	7.9	20.22	5.19	20.22	5.30	20.22	5.42	19.41	5.18	18.63	4.94	17.01	4.47
11	9.8	20.22	5.01	20.22	5.11	20.22	5.22	19.41	5.00	18.63	4.76	17.01	4.31
13	11.8	20.22	4.83	20.22	4.93	20.22	5.03	19.41	4.82	18.63	4.59	17.01	4.15
15	13.7	20.22	4.65	20.22	4.75	20.22	4.85	19.41	4.64	18.63	4.42	17.01	4.00

8. Electric Characteristics

Model	Indoor Unit				Power Supply	IFM	
	Hz	Voltage	Min	Max	MFA	kW	FLA
CFT 35 INV-Ri	50	220~240	198	254	20	0.025	0.145
CFT 50 INV-Ri	50	220~240	198	254	15	0.055	0.57
CFT 70 INV-Ri	50	220~240	198	254	15	0.055	0.57
CFT 90 INV-Ri	50	220~240	198	254	15	0.08	0.63
CFT 100 INV-Ri	50	220~240	198	254	15	0.08	0.63
CFT 140 INV-Ri	50	220~240	198	254	15	0.059 (×2)	0.39 (×2)
CFT 170 INV-Ri	50	220~240	198	254	15	0.059 (×2)	0.39 (×2)

Remark:

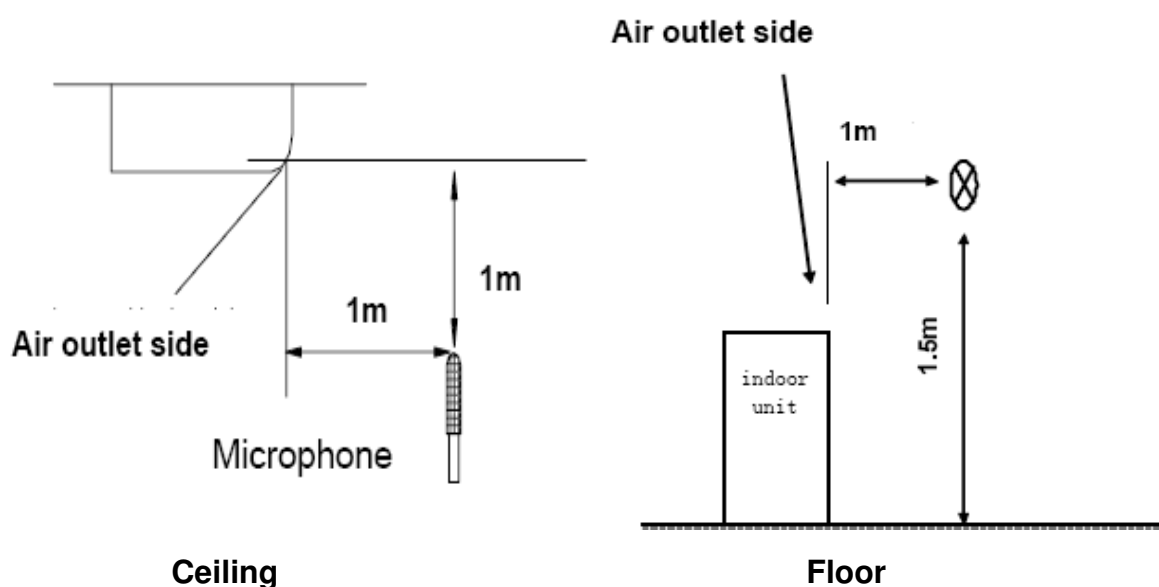
MFA: Max. Fuse Amps. (A)

KW: Fan Motor Rated Output (KW)

FLA: Full Load Amps. (A)

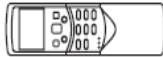
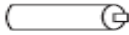
IFM: Indoor Fan Motor

9. Sound Levels



Model	Noise level dB(A)		
	H	M	L
CFT 35 INV-Ri	39.6	36.7	33.1
CFT 50 INV-Ri	43	41	38
CFT 70 INV-Ri	45	43	40
CFT 90 INV-Ri	45	43	40
CFT 100 INV-Ri	45	43	40
CFT 140 INV-Ri	47	46	44
CFT 170 INV-Ri	47	46	44

11. Accessories

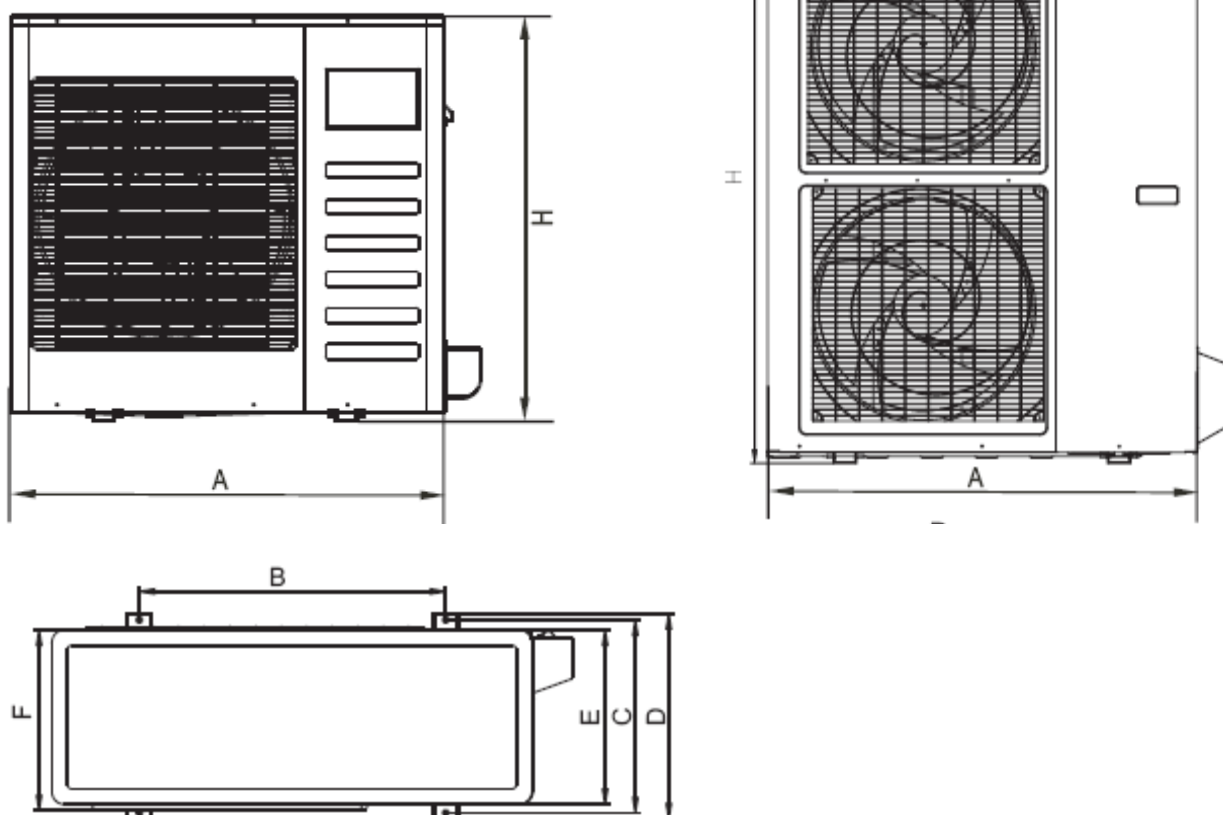
	Name	Shape	Quantity
Installation Fittings	1.Hook		2
	2.Hanging arm		2
Remote Controller & Its Frame	3. Remote controller		1
	4. Frame		1
	5. Mounting screw(ST2.9×10-C-H)		2
	6. Alkaline dry batteries (AM4)		2
Others	7. Owner's manual		1
	8. Installation manual		1

Part 3

Outdoor Units

1. Dimensions	
2. Service Space	
3. Piping Diagrams	
4. Wiring Diagrams	
5. Field Wiring	
6. Electric Characteristics	
7. Sound Levels	
9. Operation Limits	
10. Troubleshooting	

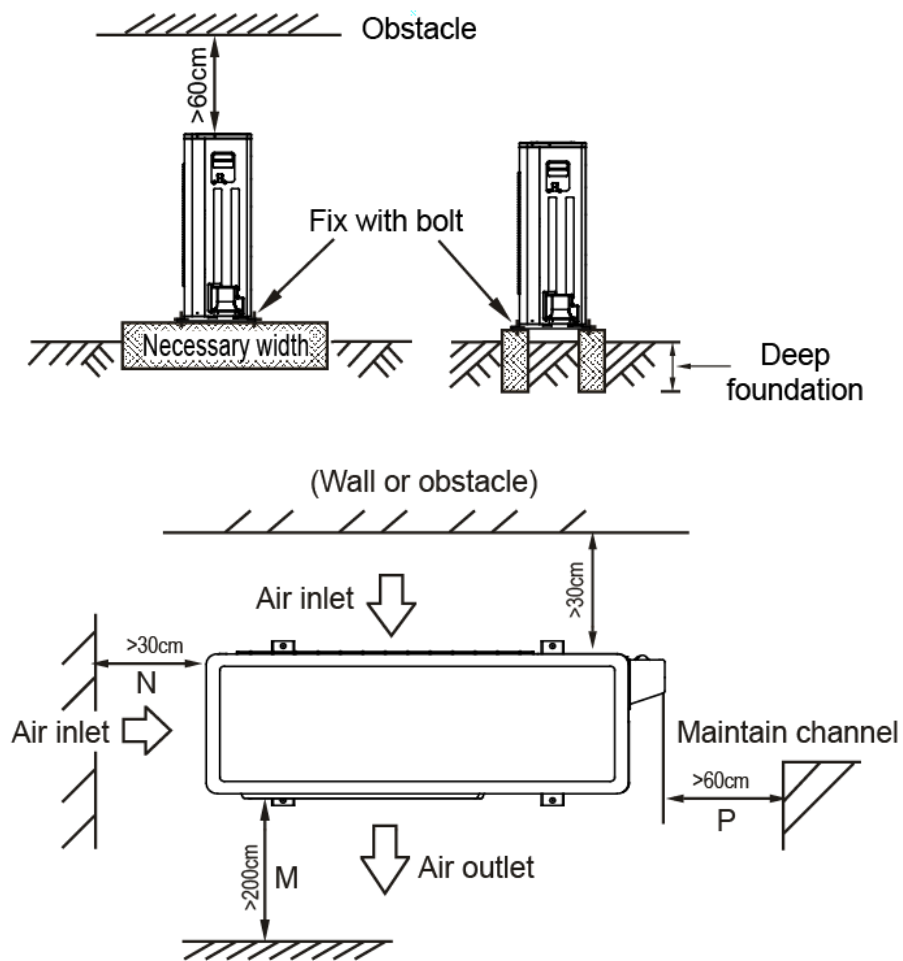
1. Dimensions



Unit: mm

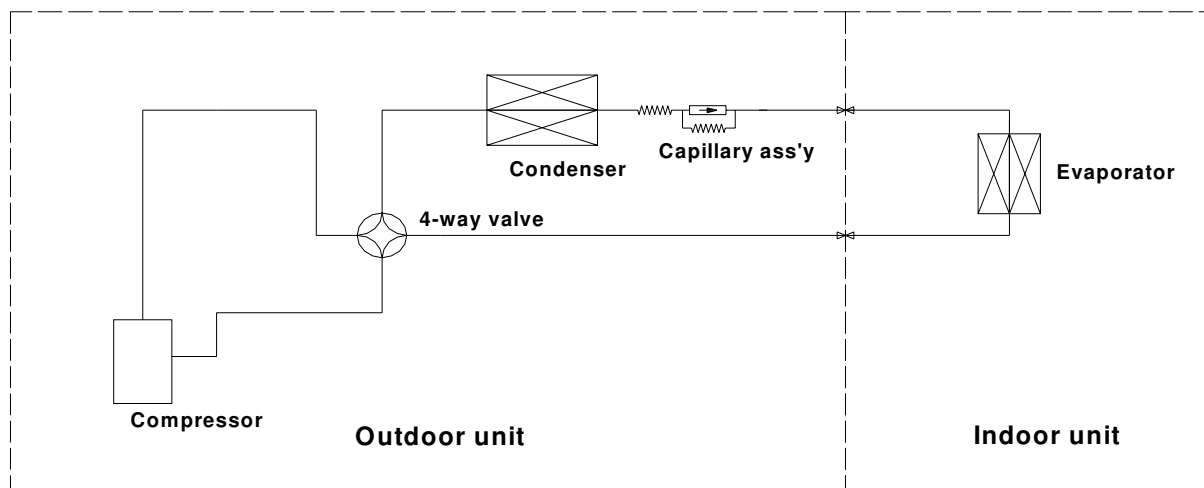
MODEL	A	B	C	D	E	F	H
CCT 301 INV- CFT 35 INV-Ro DCT 35 INV-So	761	530	290	315	270	279	593
CCT 501 INV- CCT 50 INV-So CFT 50 INV-Ro DCT 50 INV-So	842	560	335	360	312	324	695
CCT 70 INV-So CFT 70 INV-Ro DCT 70 INV-So	895	862	313	355	302	80	862
CCT 90 INV-So CFT 90 INV-Ro DCT 90 INV-So	990	624	366	396	340	354	966
CCT 100 INV-So-1 CFT 100 INV-Ro-1 DCT 100 INV-So-1	940	600	376	400	340	360	1245
CCT 100 INV-So CFT 100 INV-Ro DCT 100 INV-So	990	624	366	396	340	354	966
CCT 140 INV-So-1 CFT 140 INV-Ro-1 DCT 140 INV-So-1	940	600	376	400	340	360	1245
CCT 140 INV-So CFT 140 INV-Ro DCT 140 INV-So	940	600	376	400	340	360	1245
CCT 170 INV-So CFT 170 INV-Ro DCT 170 INV-So	940	600	376	400	340	360	1245
DHP 170 INV -Ro	940	600	376	400	340	360	1245

2. Service Space

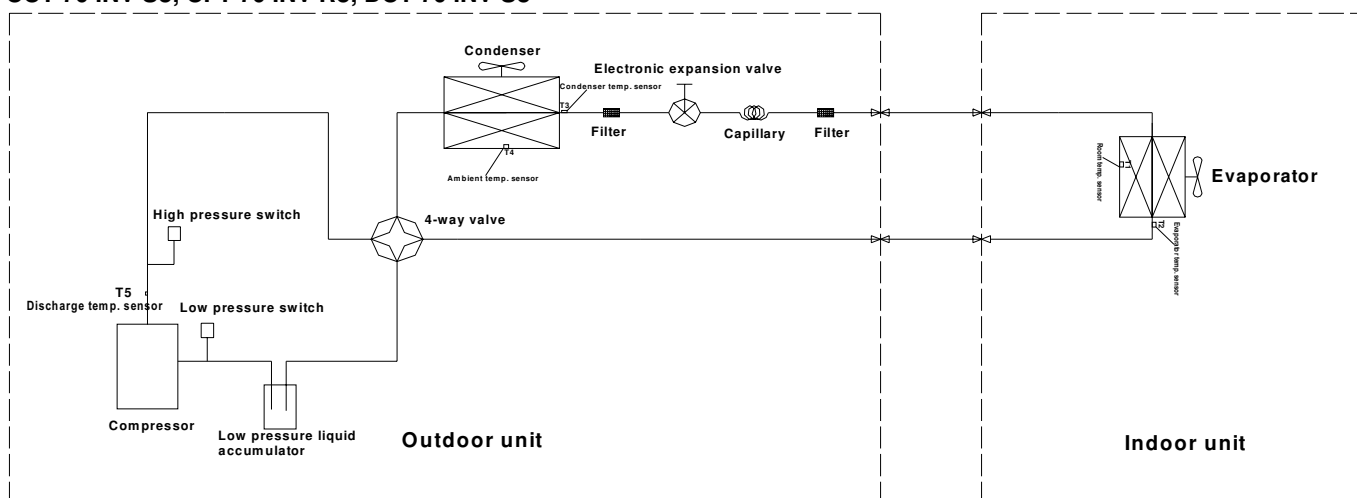


3. Piping Diagrams

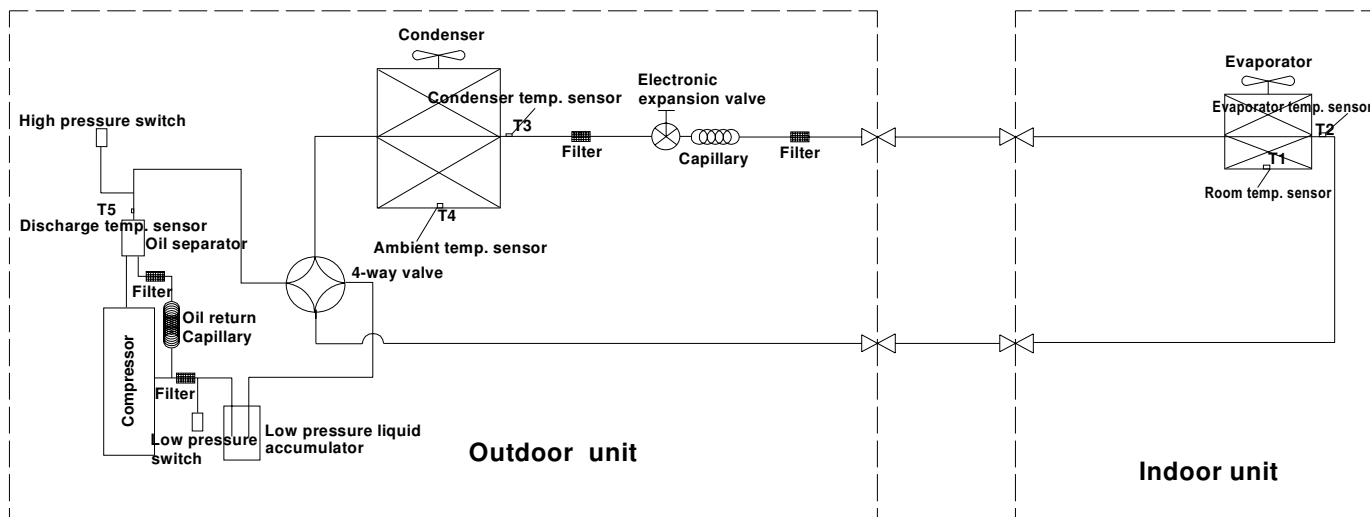
CCT 301 INV-0, CFT 35 INV-Ro, DCT 35 INV-So



CCT 501 INV-0, CCT 50 INV-So, CFT 50 INV-Ro, DCT 50 INV-So
CCT 70 INV-So, CFT 70 INV-Ro, DCT 70 INV-So

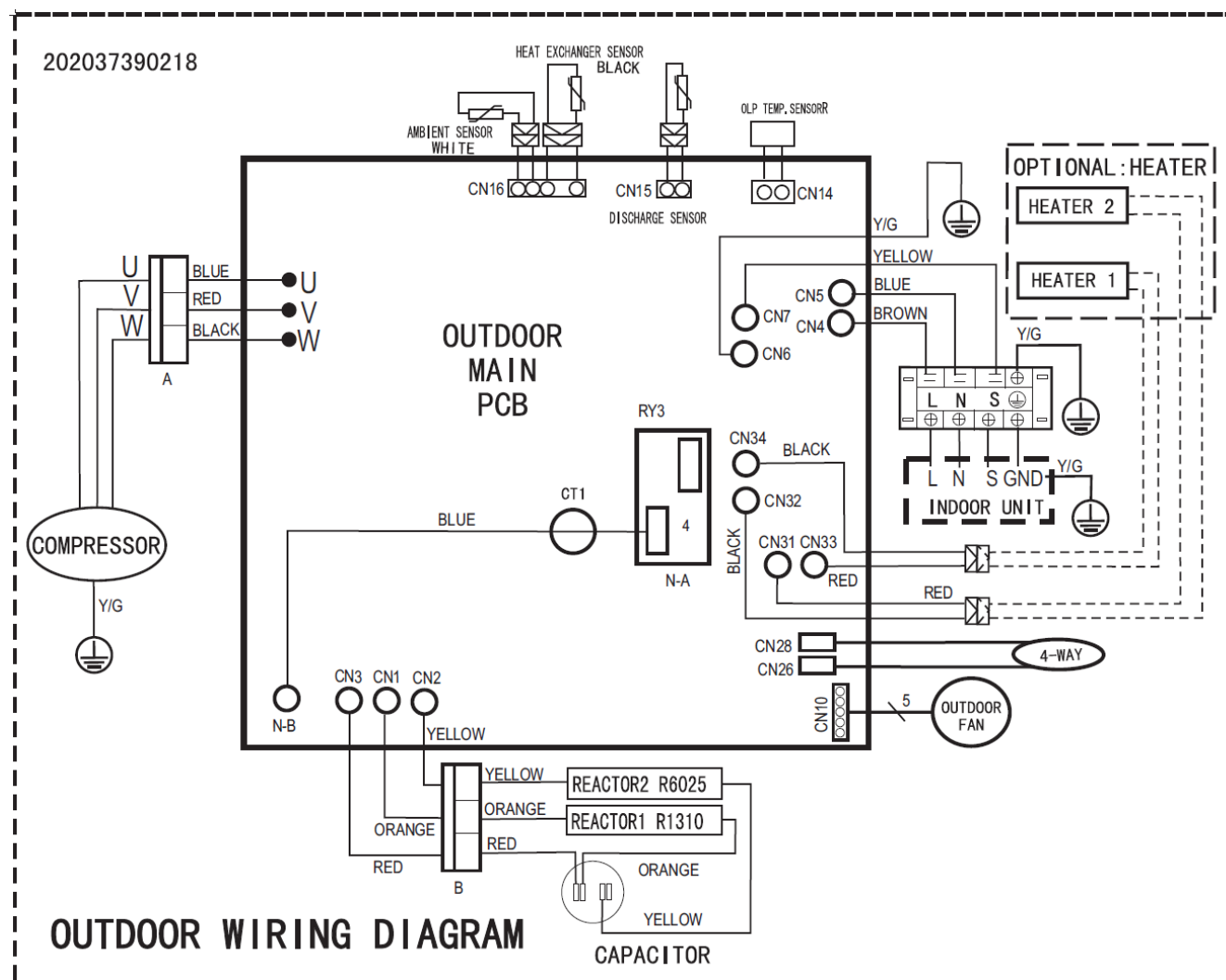


CCT 90 INV-So, CFT 90 INV-Ro, DCT 90 INV-So,
CCT 100 INV-So-1, CFT 100 INV-Ro-1, DCT 100 INV-So-1
CCT 100 INV-So, CFT 100 INV-Ro, DCT 100 INV-So,
CCT 140 INV-So-1, CFT 140 INV-Ro-1, DCT 140 INV-So-1
CCT 140 INV-So, CFT 140 INV-Ro, DCT 140 INV-So,
CCT 170 INV-So, CFT 170 INV-Ro, DCT 170 INV-So, DHP 170 INV -Ro



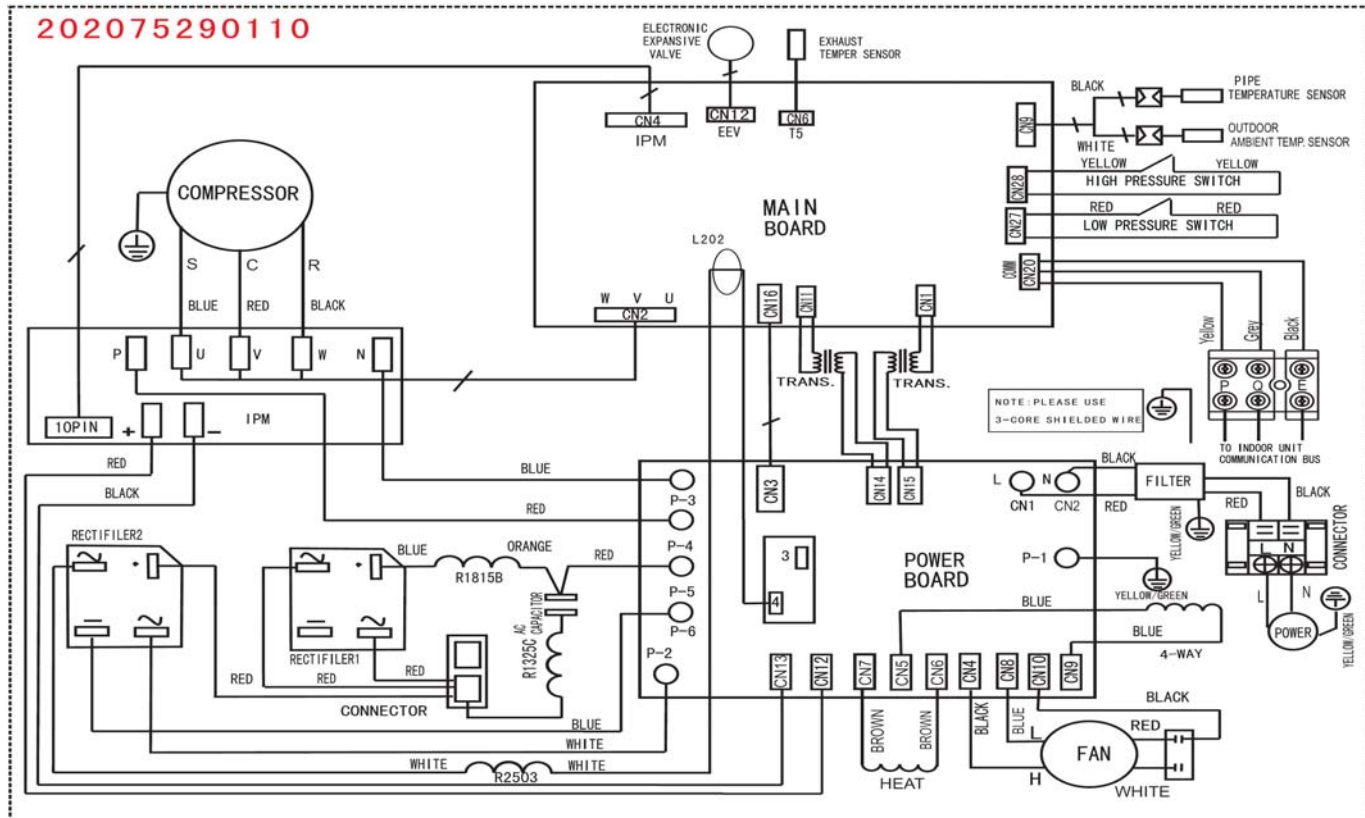
4. Wiring Diagrams

CCT 301 INV_o, CFT 35 INV-R_o, DCT 35 INV-S_o



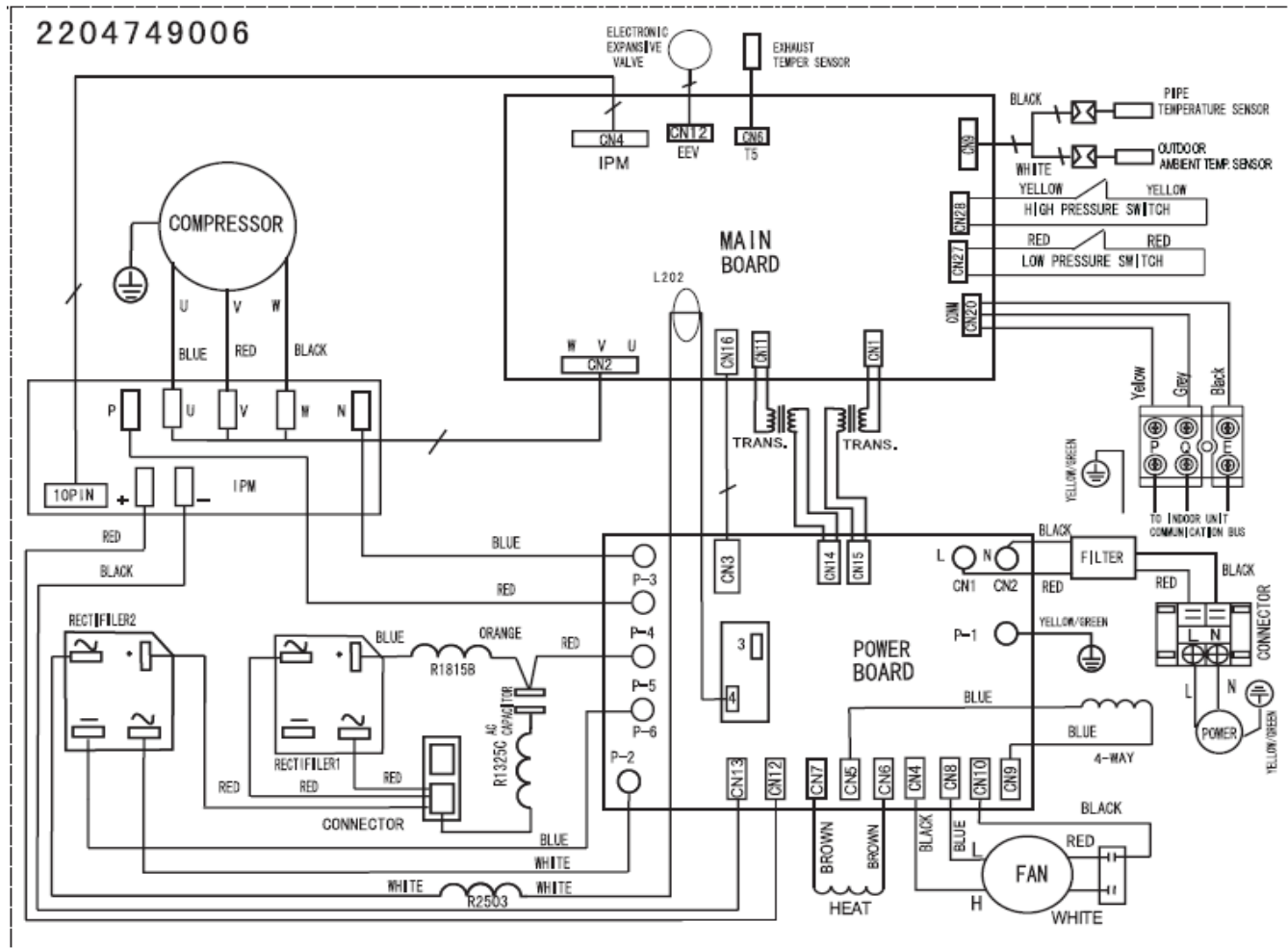
CCT 501 INV-0, CCT 50 INV-So, CFT 50 INV-Ro, DCT 50 INV-So

202075290110



CCT 70 INV-So, CFT 70 INV-Ro, DCT 70 INV-So

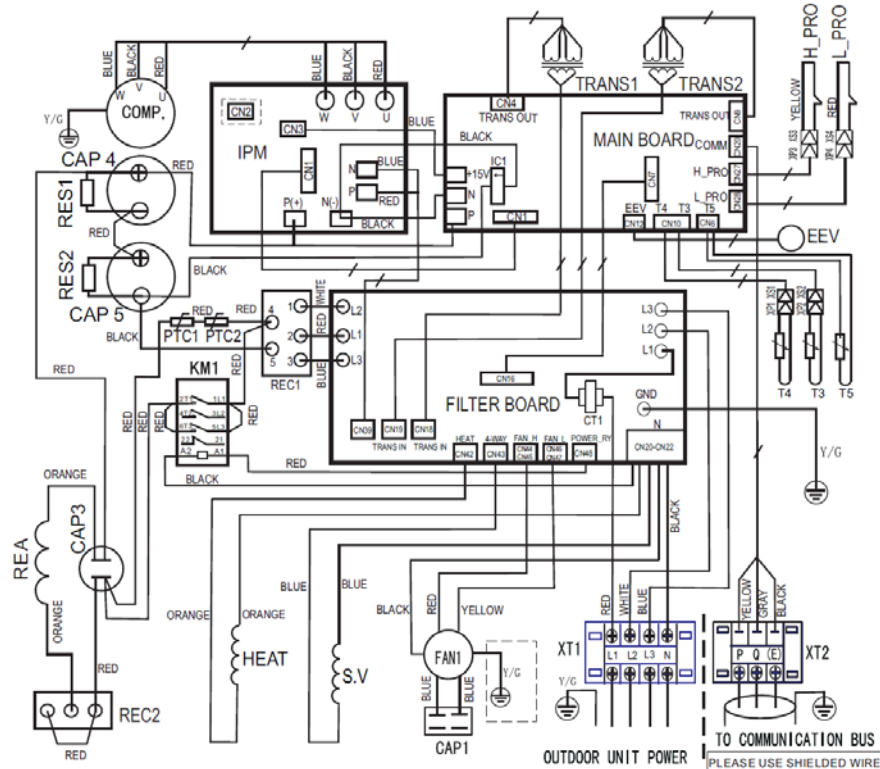
2204749006



CCT 100 INV-So, CFT 100 INV-Ro, DCT 100 INV-So

WIRING DIAGRAM (OUTDOOR UNIT)

202075590212



CODE	PART NAME
COMP	COMPRESSOR
CAP1-CAP5	CAPACITOR
CT1, IC1	CURRENT DETECTOR
EEV	ELECTRIC EXPANSIVE VALVE
FAN1	OUTDOOR FAN MOTOR
HEAT	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
KM1	AC CONTACTOR
PTC1, PTC2	PTC ELEMENT
REA	REACTOR
REC1, REC2	RECTIFIER
RES1, RES2	RESISTANCE
S.V	4-WAY VALVE
TRANS1, TRANS2	TRANSFORMER
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
T5	COMP. DISCHARGE TEMPERATURE SENSOR
XS1-XS2	CONNECTOR
XP1-XP2	CONNECTOR
XT1	4-WAY TERMINAL
XT2	SMALL 3-WAY TERMINAL

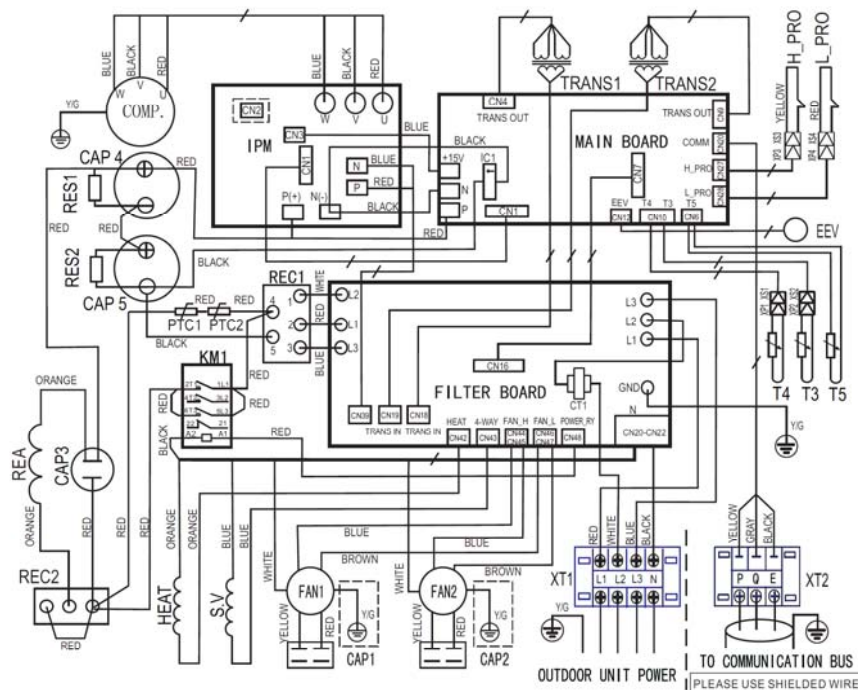
Malfunction Code for Outdoor unit

Display	Malfunction or Protection
E0	EEPROM malfunction
E2	Communication malfunction between indoor/outdoor units
E3	Communication malfunction of outdoor unit controller
E4	Outdoor unit temperature sensor malfunction
E5	Power voltage protection
P1	High pressure protection
P2	Low pressure protection
P3	Current protection
P4	Compressor discharge temperature protection
P5	Condenser high temperature protection
P6	Inverter module protection

CCT 140 INV-So, CFT 140 INV-Ro, DCT 140 INV-So,
CCT 170 INV-So, CFT 170 INV-Ro, DCT 170 INV-So

WIRING DIAGRAM (OUTDOOR UNIT)

(202075790151)

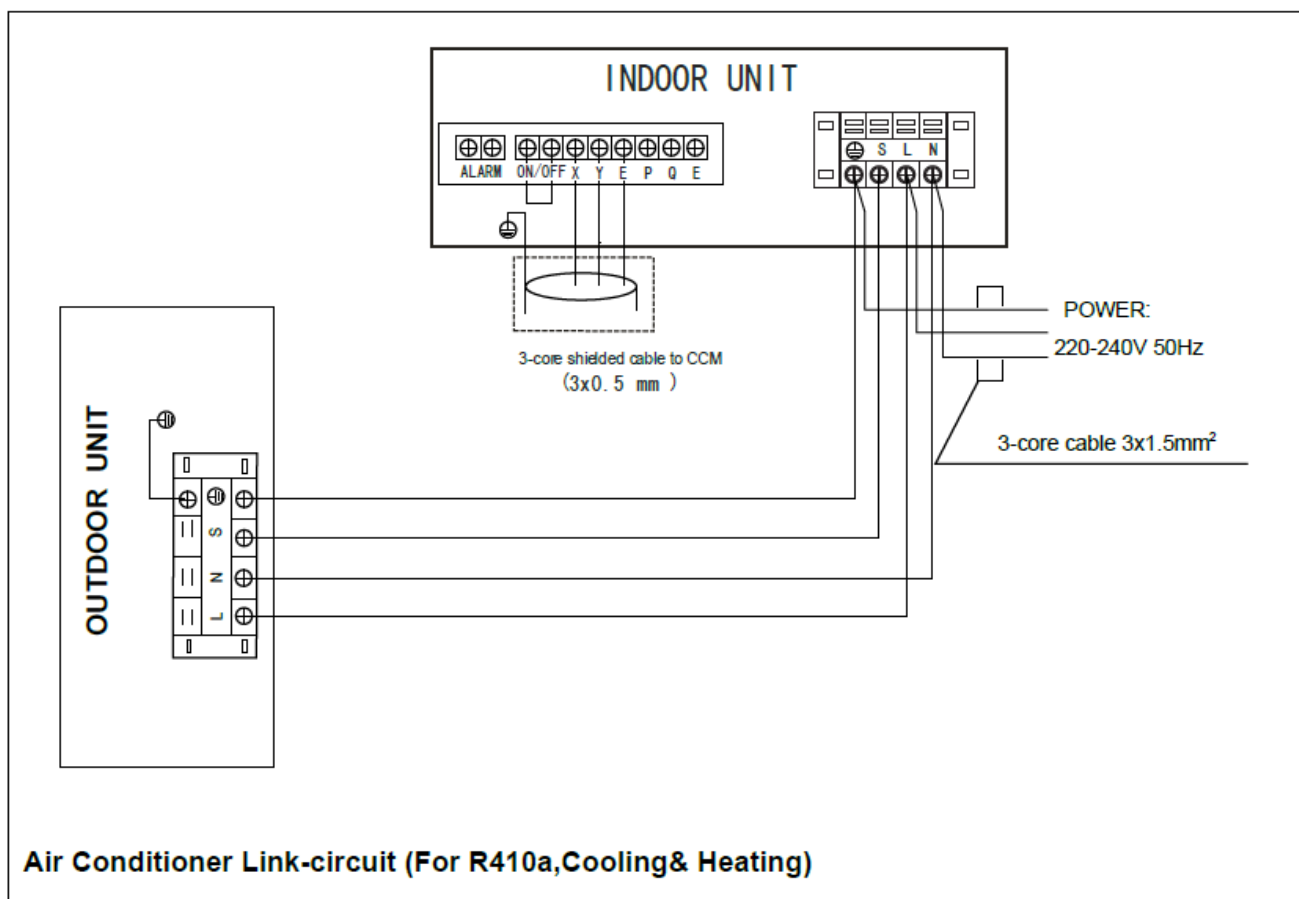


CODE	PART NAME
COMP	COMPRESSOR
CAP1-CAP5	CAPACITANCE
CT1, IC1	CURRENT DETECTOR
EEV	ELECTRIC EXPANSIVE VALVE
FAN1, FAN2	OUTDOOR FAN MOTOR
HEAT	CRANKCASE HEATING
H-PRO	HIGH PRESSURE SWITCH
L-PRO	LOW PRESSURE SWITCH
KM1	AC CONTACTOR
PTC1, PTC2	PTC ELEMENT
REA	REACTOR
REC1, REC2	RECTIFIER
RES1, RES2	RESISTANCE
S.V	4-WAY VALVE
TRANS1, TRANS2	TRANSFORMER
T3	CONDENSER TEMPERATURE SENSOR
T4	OUTDOOR AMBIENT TEMPERATURE SENSOR
T5	COMP. DISCHARGE TEMPERATURE SENSOR
XS1-XS2	CONNECTOR
XP1-XP2	CONNECTOR
XT1	4-WAY TERMINAL
XT2	SMALL 3-WAY TERMINAL

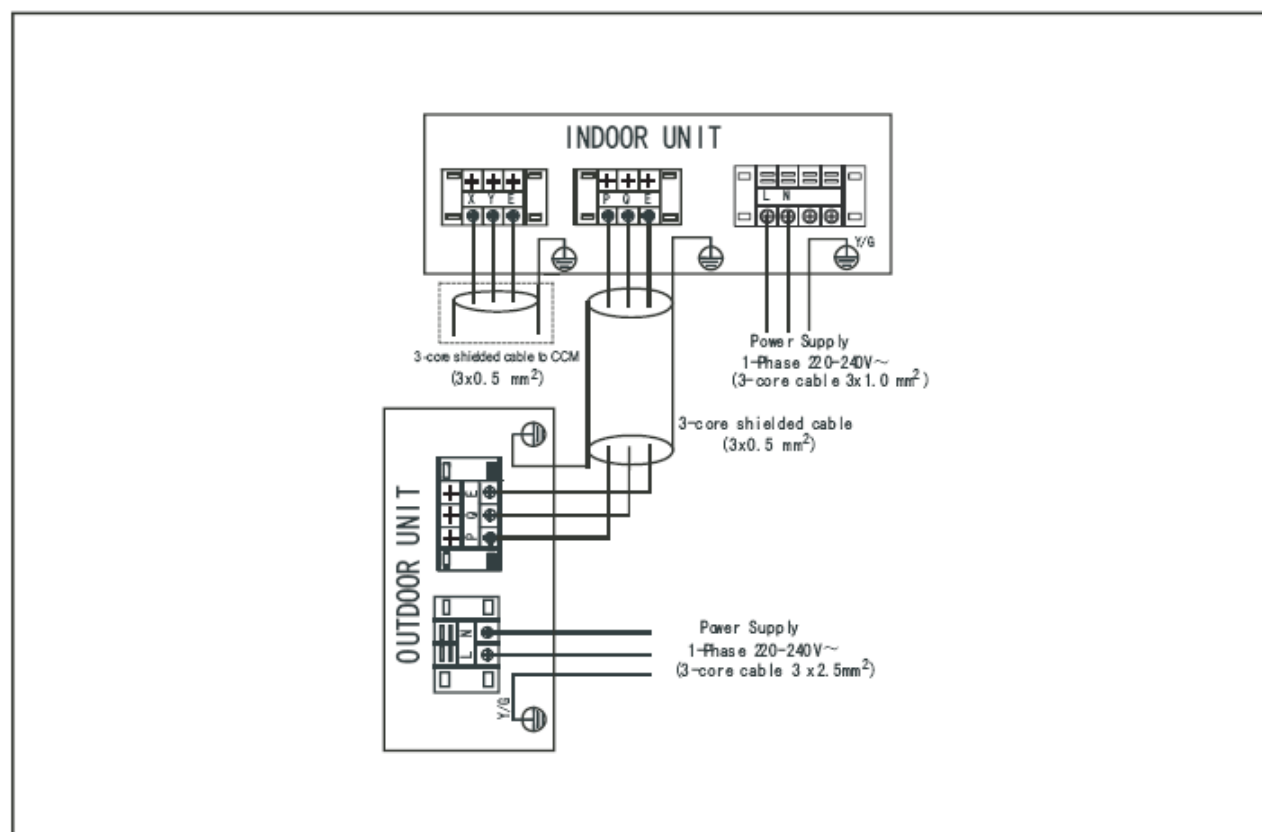
Malfunction Code for Outdoor unit

Display	Malfunction or Protection
E0	EEPROM malfunction
E2	Communication malfunction between indoor/outdoor units
E3	Communication malfunction of outdoor unit controller
E4	Outdoor unit temperature sensor malfunction
E5	Power voltage protection
P1	High pressure protection
P2	Low pressure protection
P3	Current protection
P4	Compressor discharge temperature protection
P5	Condenser high temperature protection
P6	Inverter module protection

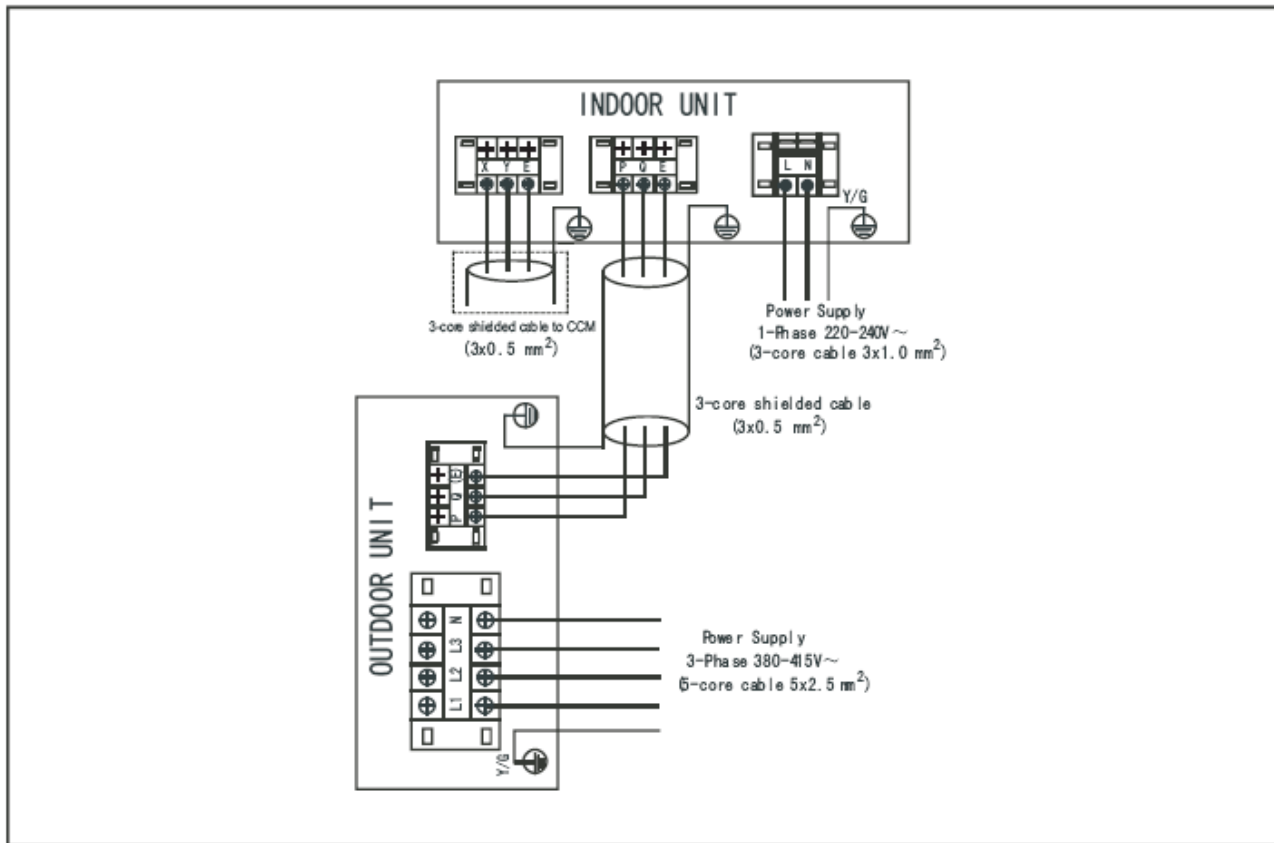
5. Field Wiring



For 12000Btu/h (with -1Phase outdoor unit)



For 18000-24000Btu/h (with 1-phase outdoor unit)



For 36000-60000Btu/h (with 3-phase outdoor unit)

6. Electric Characteristics

Model	Outdoor Unit				Power Supply		Compressor	OFM	
	Hz	Voltage	Min.	Max.	TOCA	MFA	RLA	kW	FLA
CCT 301 INV- CFT 35 INV-Ro DCT 35 INV-So	50	220-240	198	254	10	30	5.3	0.024	0.3
CCT 501 INV- CCT 50 INV-So CFT 50 INV-Ro DCT 50 INV-So	50	220-240	198	254	20	30	8.96	0.053	0.59
CCT 70 INV-So CFT 70 INV-Ro DCT 70 INV-So	50	220-240	198	254	20	30	10.4	0.053	0.67
CCT 90 INV-So CFT 90 INV-Ro DCT 90 INV-So	50	220-240	198	254	20	40	13.5	0.2	1.4
CCT 100 INV-So-1 CFT 100 INV-Ro-1 DCT 100 INV-So-1	50	220-240	198	254	30	40	13.6	0.1×2	0.8
CCT 140 INV-So-1 CFT 140 INV-Ro-1 DCT 140 INV-So-1	50	220-240	198	254	30	40	13.6	0.1×2	0.8
CCT 100 INV-So CFT 100 INV-Ro DCT 100 INV-So	50	380	342	440	20	40	9.3	0.2	1.4
CCT 140 INV-So CFT 140 INV-Ro DCT 140 INV-So	50	380	342	440	20	40	9.3	0.1×2	0.8×2
CCT 170 INV-So CFT 170 INV-Ro DCT 170 INV-So	50	380	342	440	20	40	15.2	0.1×2	0.8×2
DHP 170 INV -Ro	50	380-415	342	440	20	40	15.2	0.1×2	0.8×2

Remark:

TOCA: Total Over-current Amps. (A)

MFA: Max. Fuse Amps. (A)

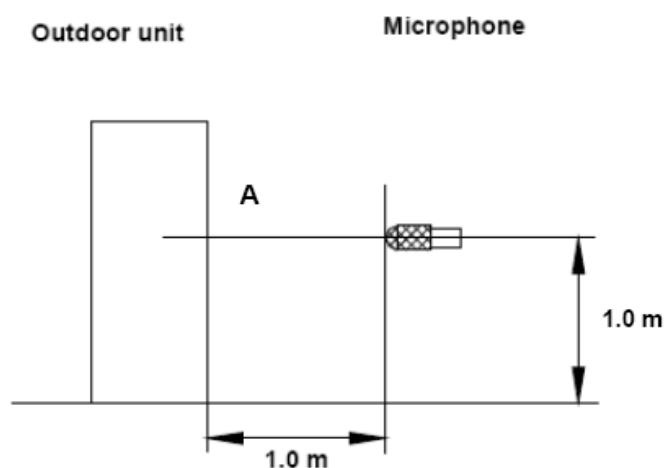
RLA: Rated Locked Amps. (A)

OFM: Outdoor Fan Motor.

FLA: Full Load Amps. (A)

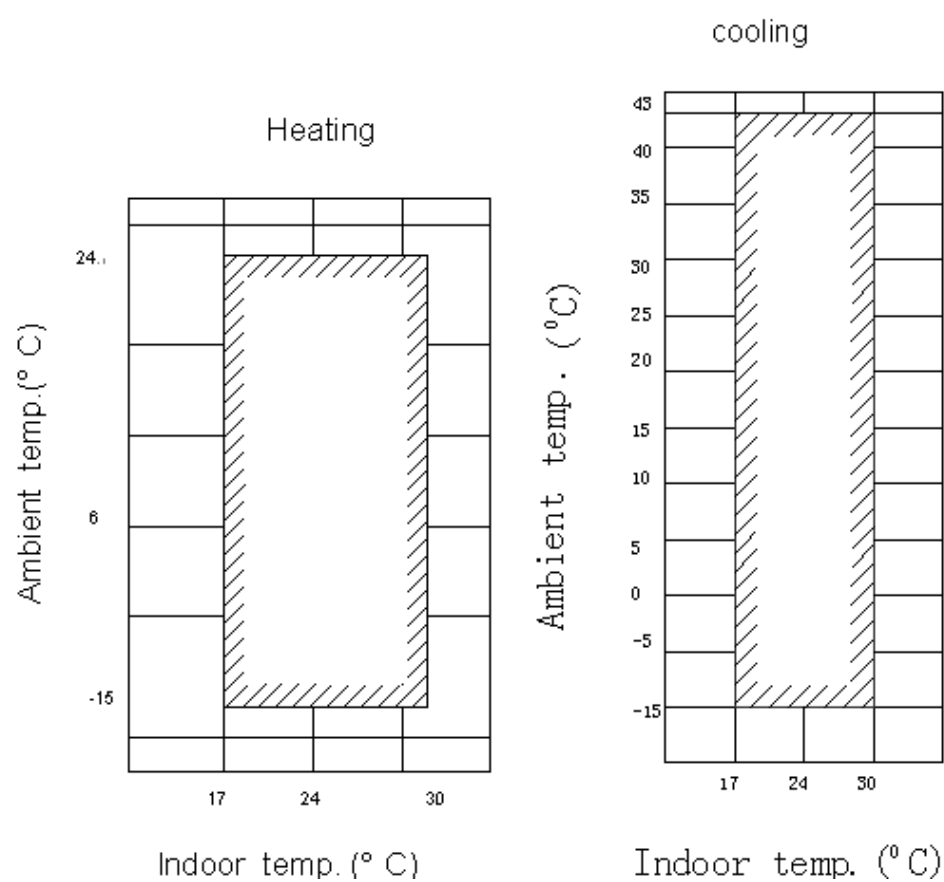
KW: Rated Motor Output (KW)

7. Sound Levels



Model	Noise level dB(A)
	H/L
CCT 301 INVo CFT 35 INV-Ro DCT 35 INV-So	48/44
CCT 501 INVo CCT 50 INV-So CFT 50 INV-Ro DCT 50 INV-So	51/46
CCT 70 INV-So CFT 70 INV-Ro DCT 70 INV-So	58/55
CCT 90 INV-So CFT 90 INV-Ro DCT 90 INV-So	55/50
CCT 100 INV-So-1 CFT 100 INV-Ro-1 DCT 100 INV-So-1	57/52
CCT 140 INV-So-1 CFT 140 INV-Ro-1 DCT 140 INV-So-1	59/54
CCT 100 INV-So CFT 100 INV-Ro DCT 100 INV-So	55/50
CCT 140 INV-So CFT 140 INV-Ro DCT 140 INV-So	59/54
CCT 170 INV-So CFT 170 INV-Ro DCT 170 INV-So	59/54
DHP 170 INV -Ro	59/54

9. Operation Limits

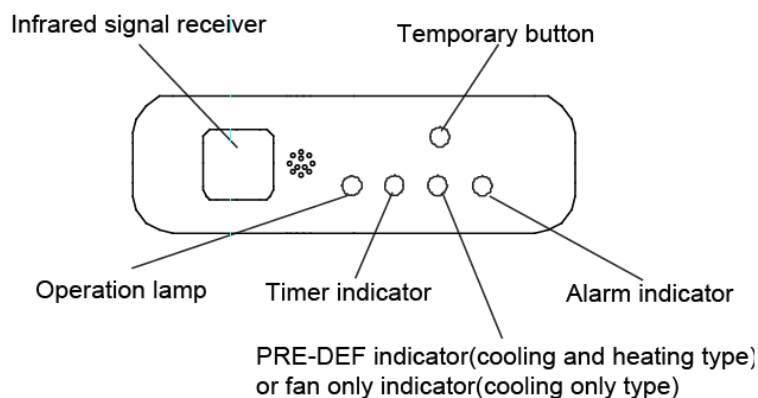


10. Troubleshooting

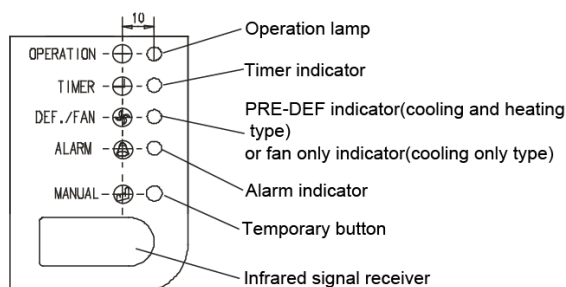
10.1 Indoor unit malfunction

10.1.1 Display board

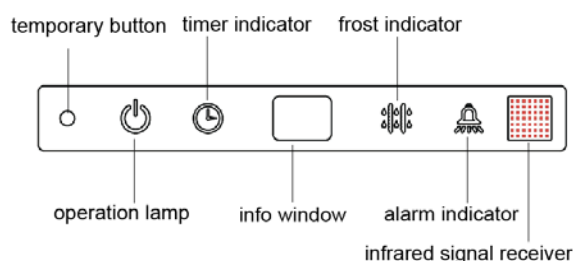
Compact 4-way cassette



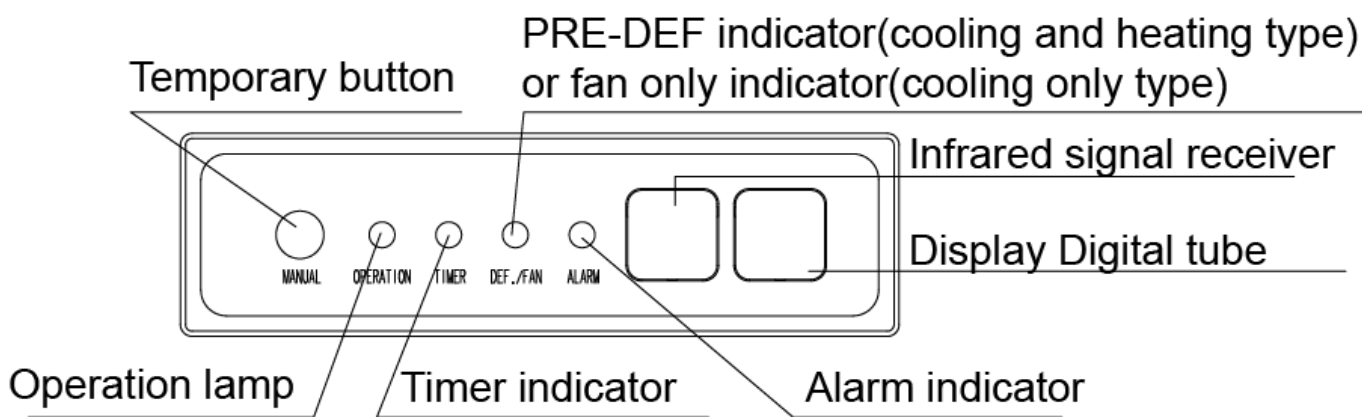
Ceiling & Floor



Normal 4-way cassette



Duct



Display panel

10.1.2 Troubleshooting

For Normal 4-way cassette

No	Malfunction	Operation lamp	Timer lamp	Defrosting lamp	Alarm lamp	Display
1	Communication malfunction between in-outdoor unit		LED2 Quick-flash			E1
2	Room temperature sensor malfunction	LED1 Quick-flash				E2
3	Pipe temperature sensor malfunction	LED1 Quick-flash				E3
4	Pipe temperature sensor malfunction	LED1 Quick-flash				E4
5	Water-level alarm				LED4 Quick-flash	EE
6	EEPROM malfunction	LED1 Slow-flash				E7
7	Mode conflicts malfunction			LED3 Quick-flash		E0
8	Outdoor malfunction				LED4 Slow-flash	Ed

For ceiling & floor & compact 4-way cassette

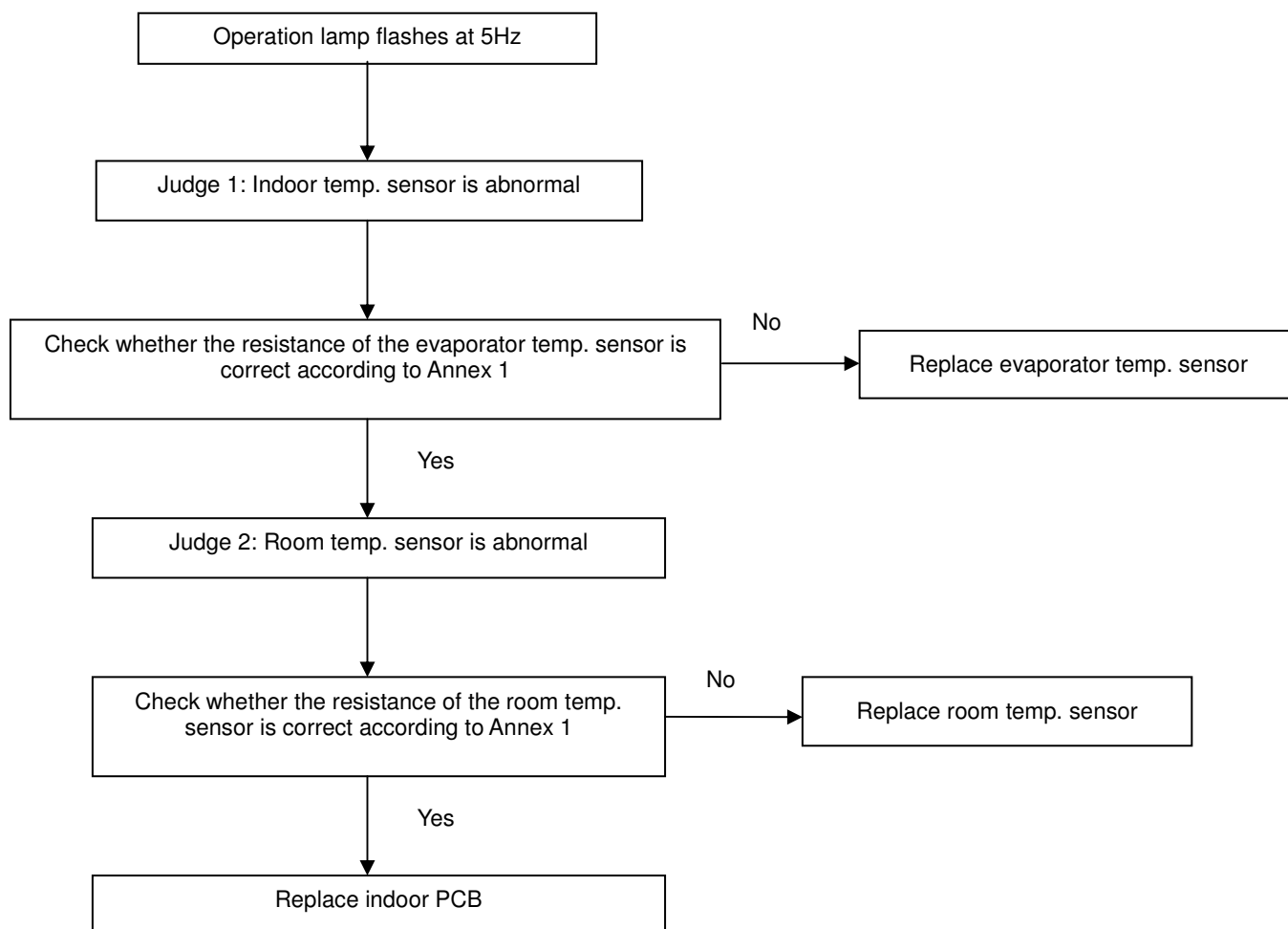
No	Malfunction	Operation lamp	Timer lamp	Defrosting lamp	Alarm lamp
1	Communication malfunction between in-outdoor unit		LED2 Quick-flash		
2	Room temperature sensor malfunction	LED1 Quick-flash			
3	Water-level alarm				LED4 Quick-flash
4	Mode conflicts malfunction			LED3 Quick-flash	
5	Outdoor malfunction				LED4 Slow-flash

For Duct type

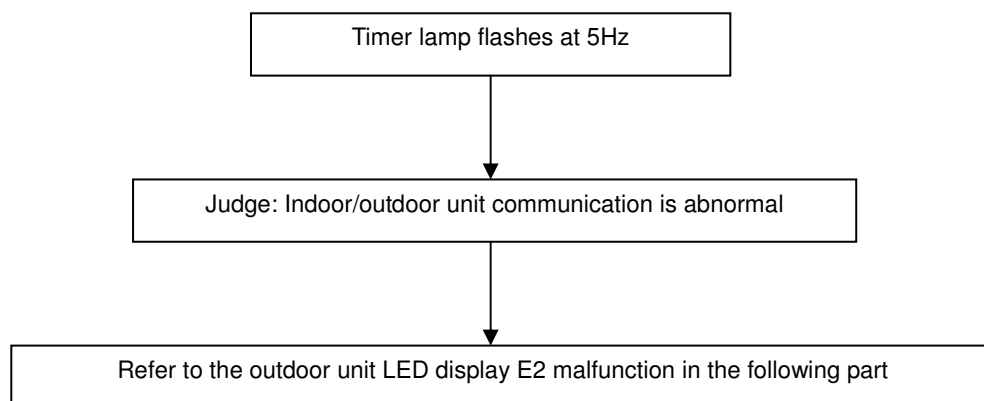
No	Malfunction & protection define	LED1 OPERATION	LED2 TIMER	LED3 DEF.FAN	LED4 ALARM	Display Digital Tube
1	Collision mode malfunction			☆		E0
2	In-Outdoor unit COMM. Checking channel is abnormal		☆			E1
3	Room TEMP. sensor checking channel is abnormal	☆				E2
4	Pipe TEMP. Sensor checking channel is abnormal(T2)	☆				E3
5	Pipe TEMP. Sensor checking channel is abnormal(T2B)	☆				E4
6	EPPROM malfunction	⊙				E7
7	Water-level alarm malfunction				☆	EE
8	Outdoor malfunction				⊙	Ed
9	Be closed by the remote control function	⊙				CP
10	Anti-cold & Defrost	●		●		

● Extinguish ☆ Flashing at 5HZ ⊙ Flashing at 1HZ

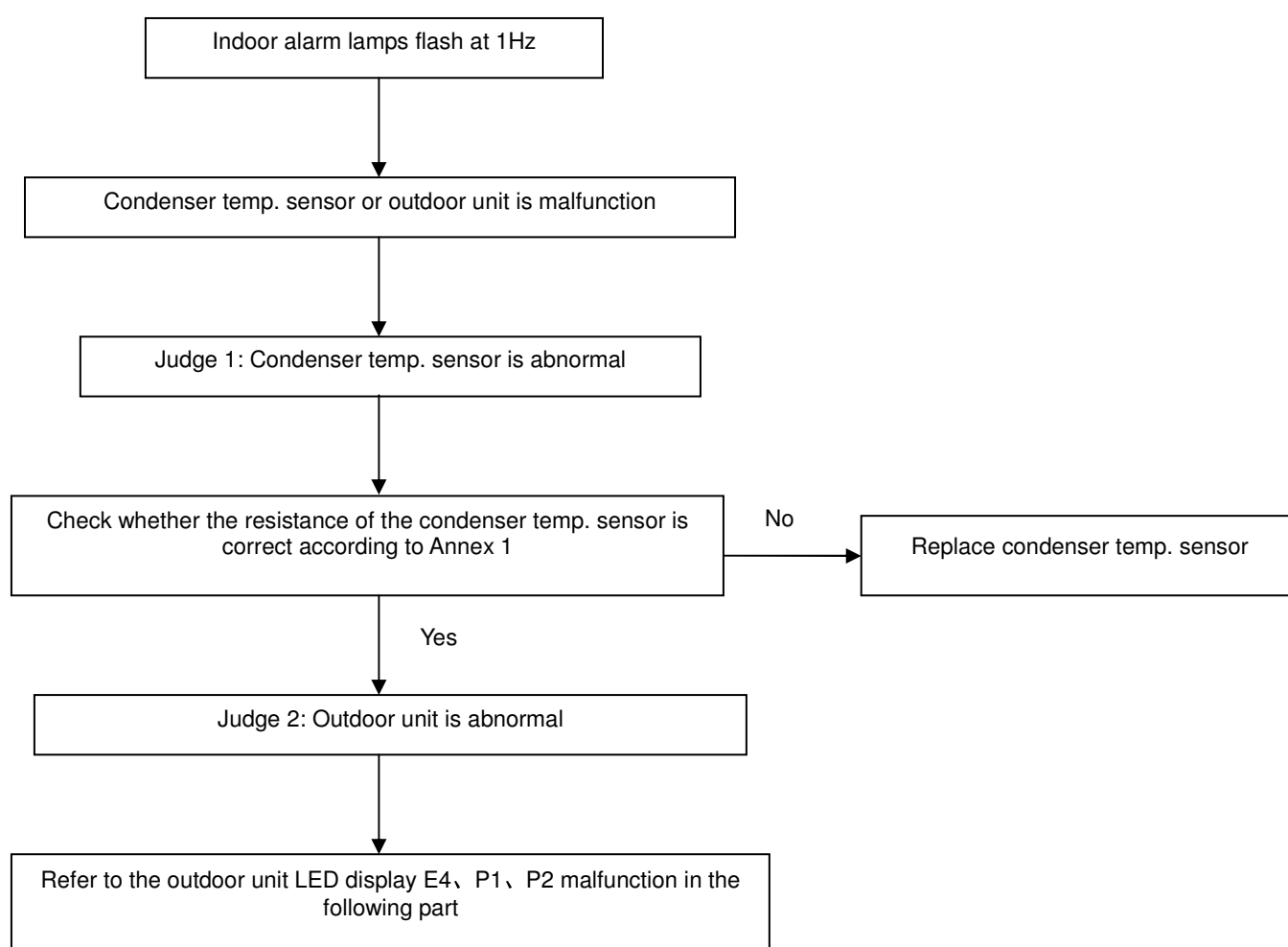
1. Operation lamp flashes



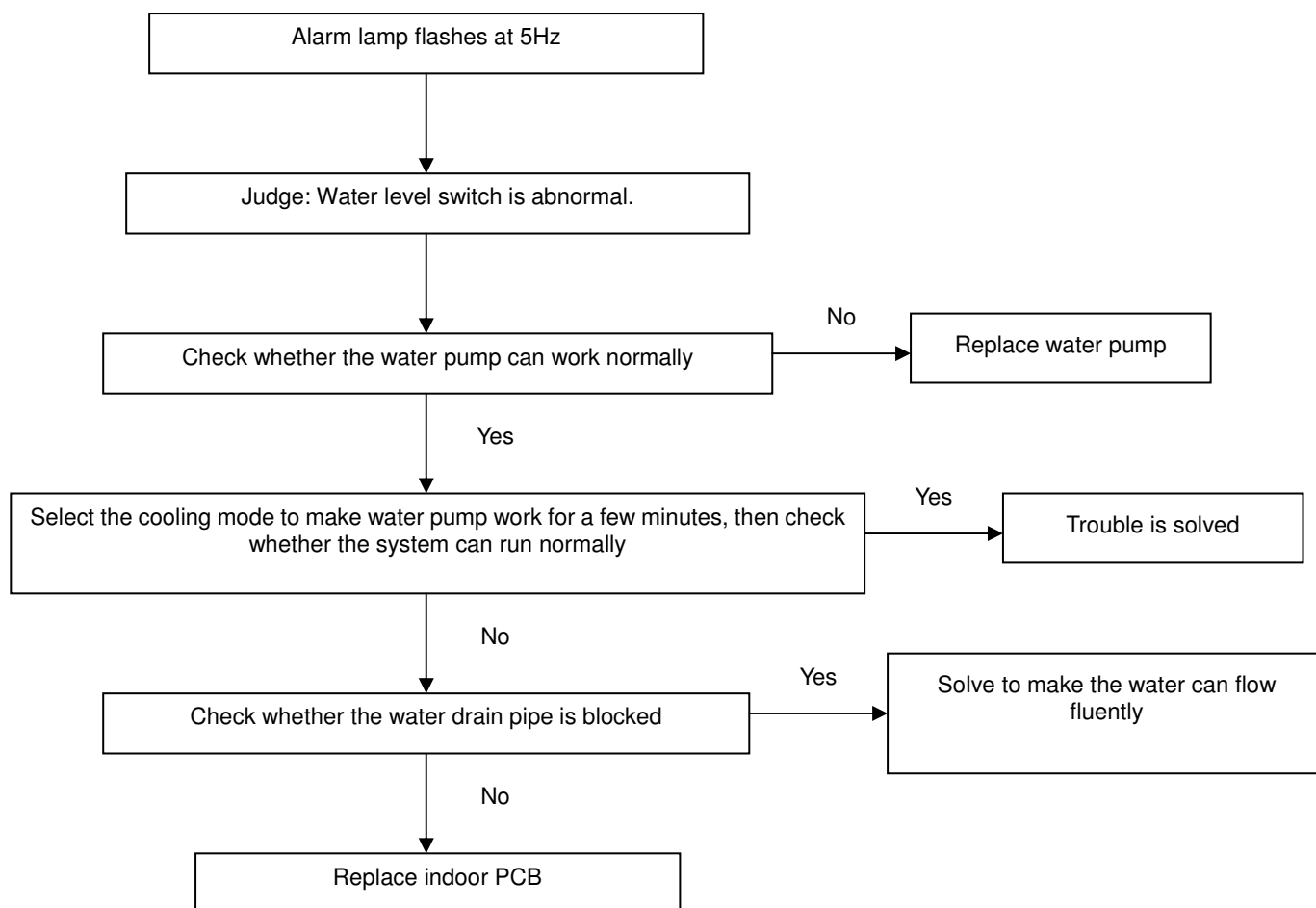
2. Timer lamp flashes



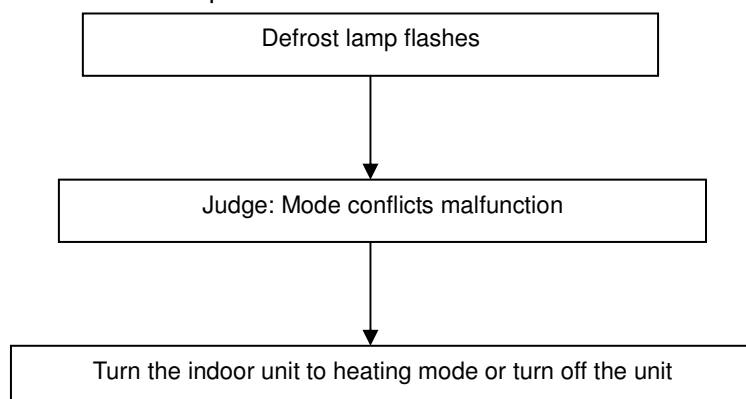
3. Alarm lamp slow-flash



4. Alarm lamp quick-flash



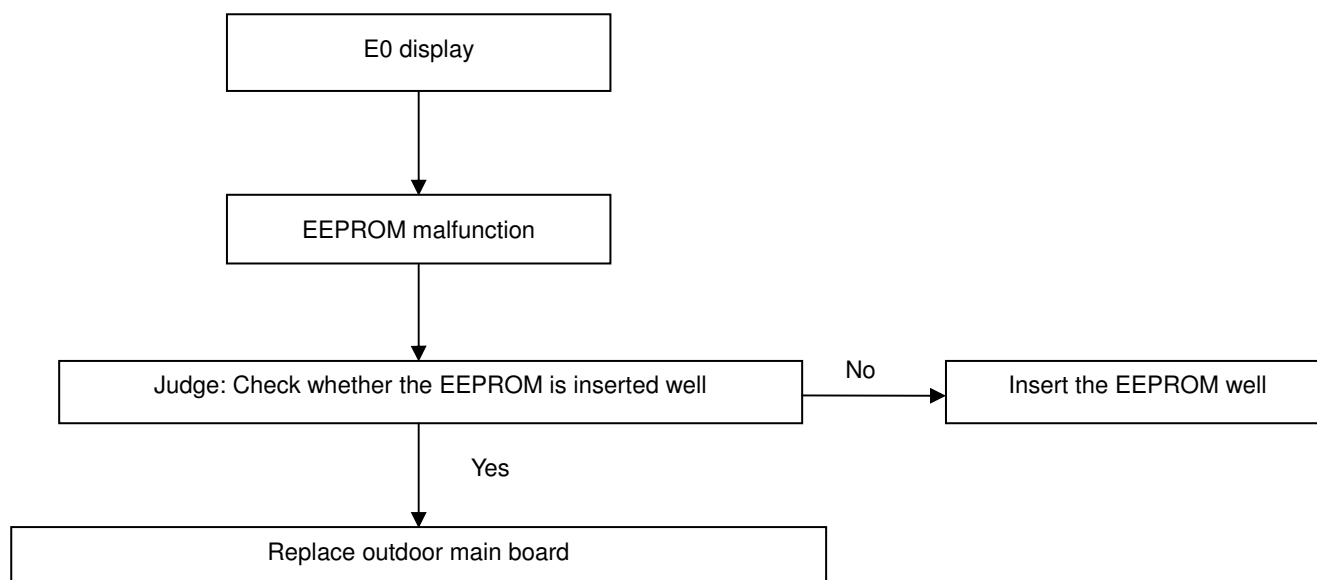
5. Defrost lamp flashes



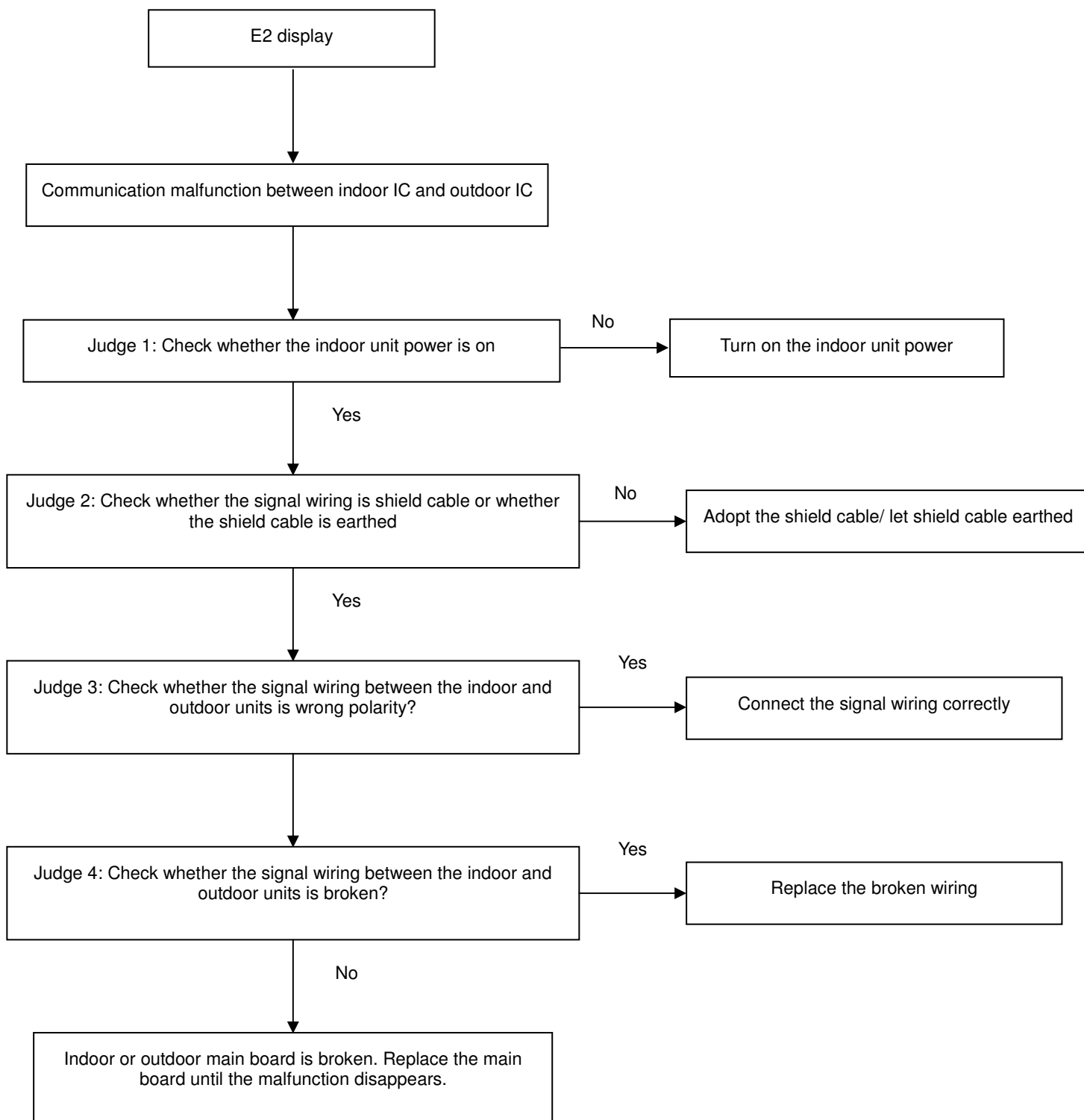
11.2 Outdoor unit malfunction

Display	Malfunction or Protection
E0	EEPROM malfunction
E2	Communication malfunction between indoor IC and outdoor IC
E3	Communication malfunction in outdoor IC and DSP
E4	Malfunction of outdoor temperature sensor
E5	Voltage protection of compressor
E6	PFC module protection (Only for 30K, 36K & 48K with 1 phase)
P0	Top temperature protection of compressor
P1	High pressure protection
P2	Low pressure protection
P3	Current protection of compressor
P4	Discharge temperature protection of compressor
P5	High temperature protection of condenser
P6	Module protection

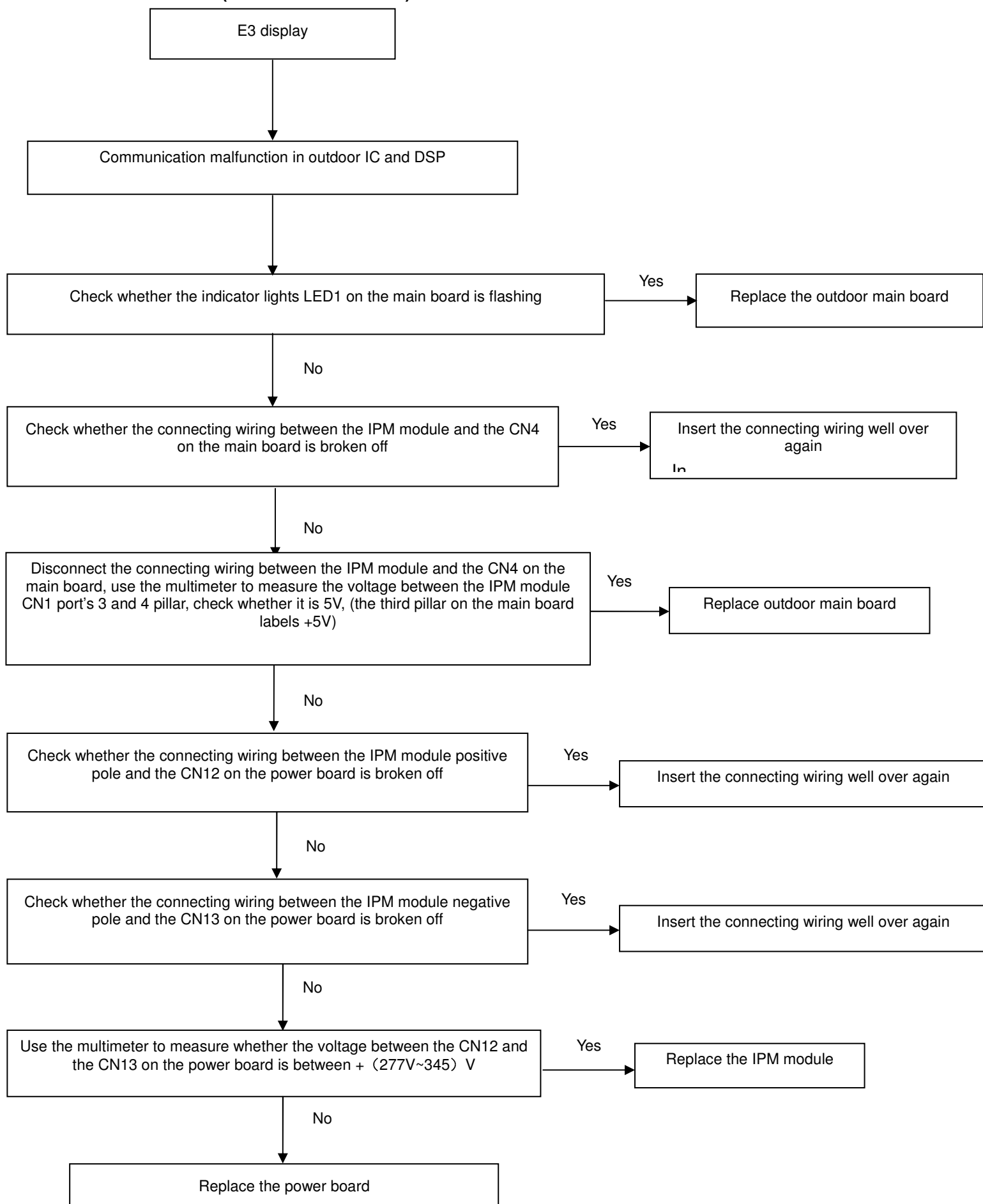
1. E0 malfunction



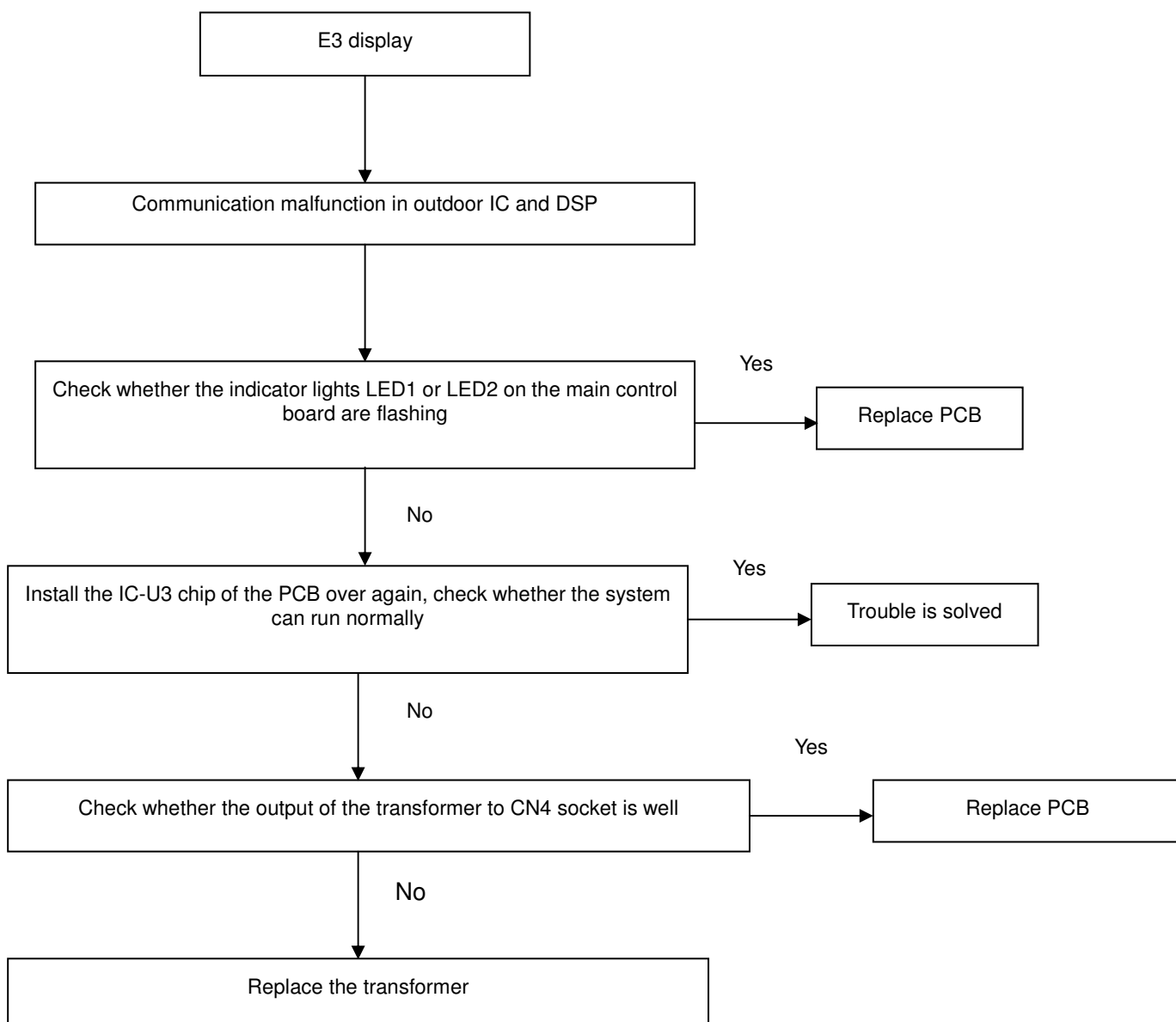
2. E2 malfunction



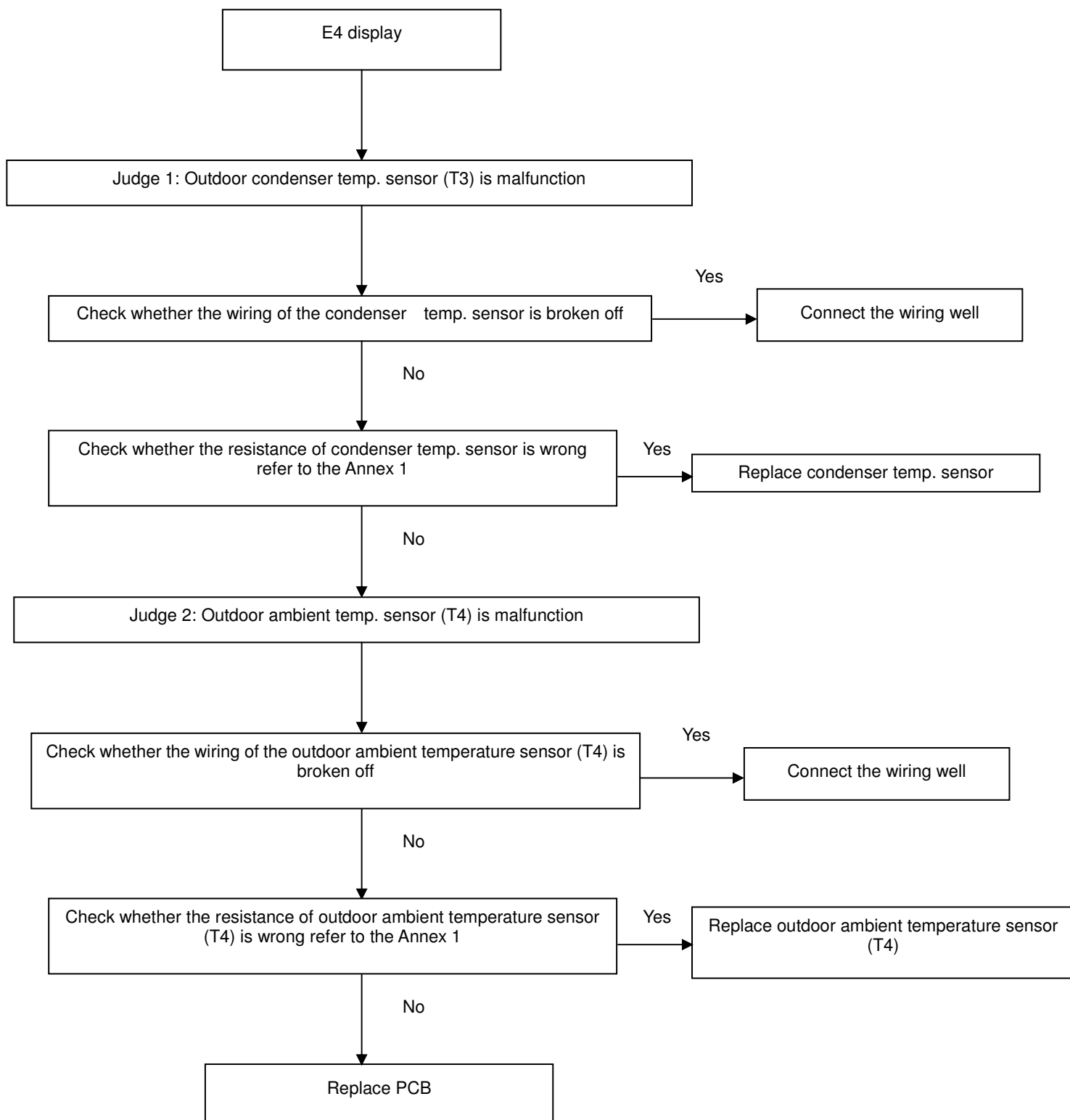
3. E3 malfunction (For 18K & 24K & 30K)



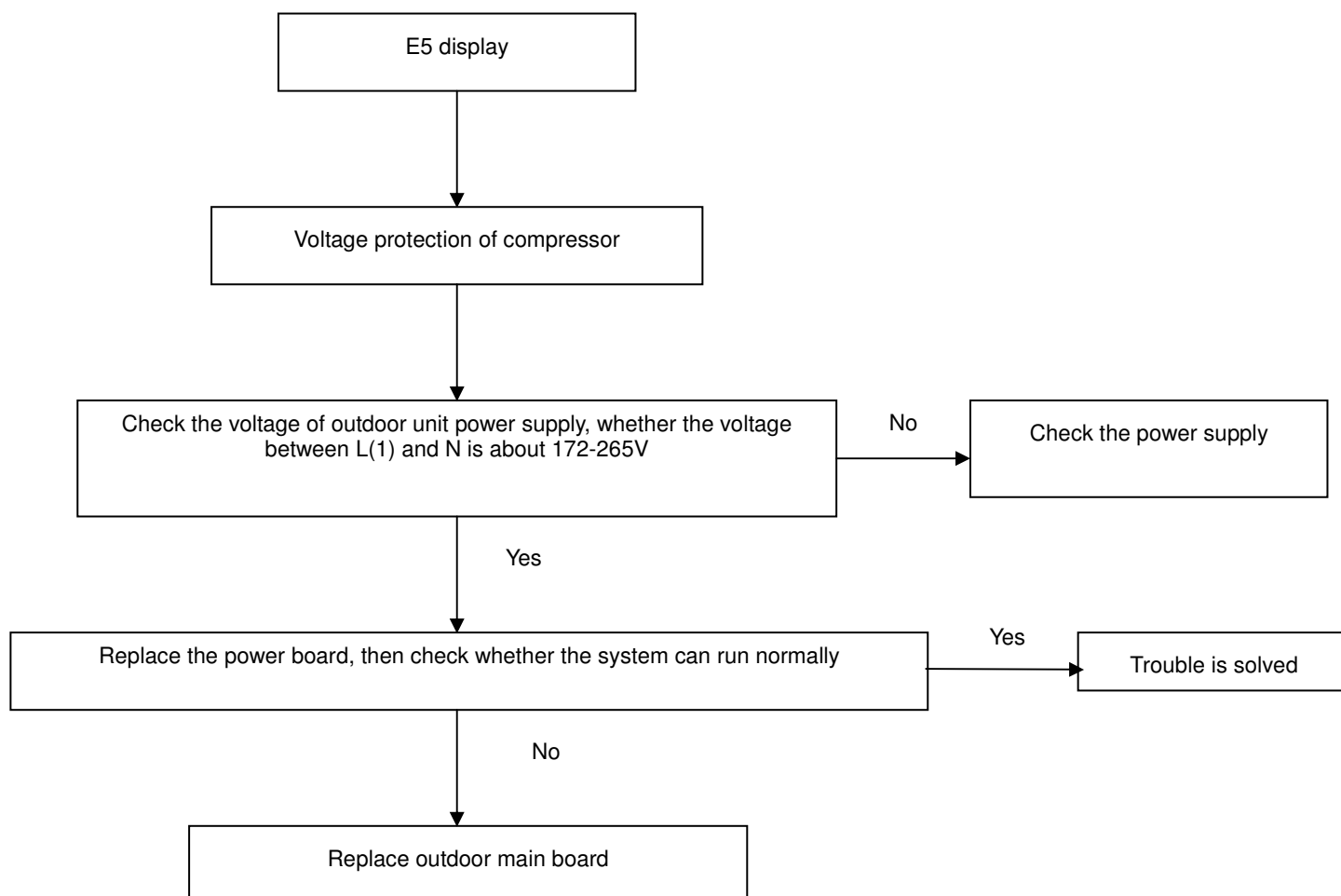
4. E3 malfunction (For 36K & 48K & 60K)



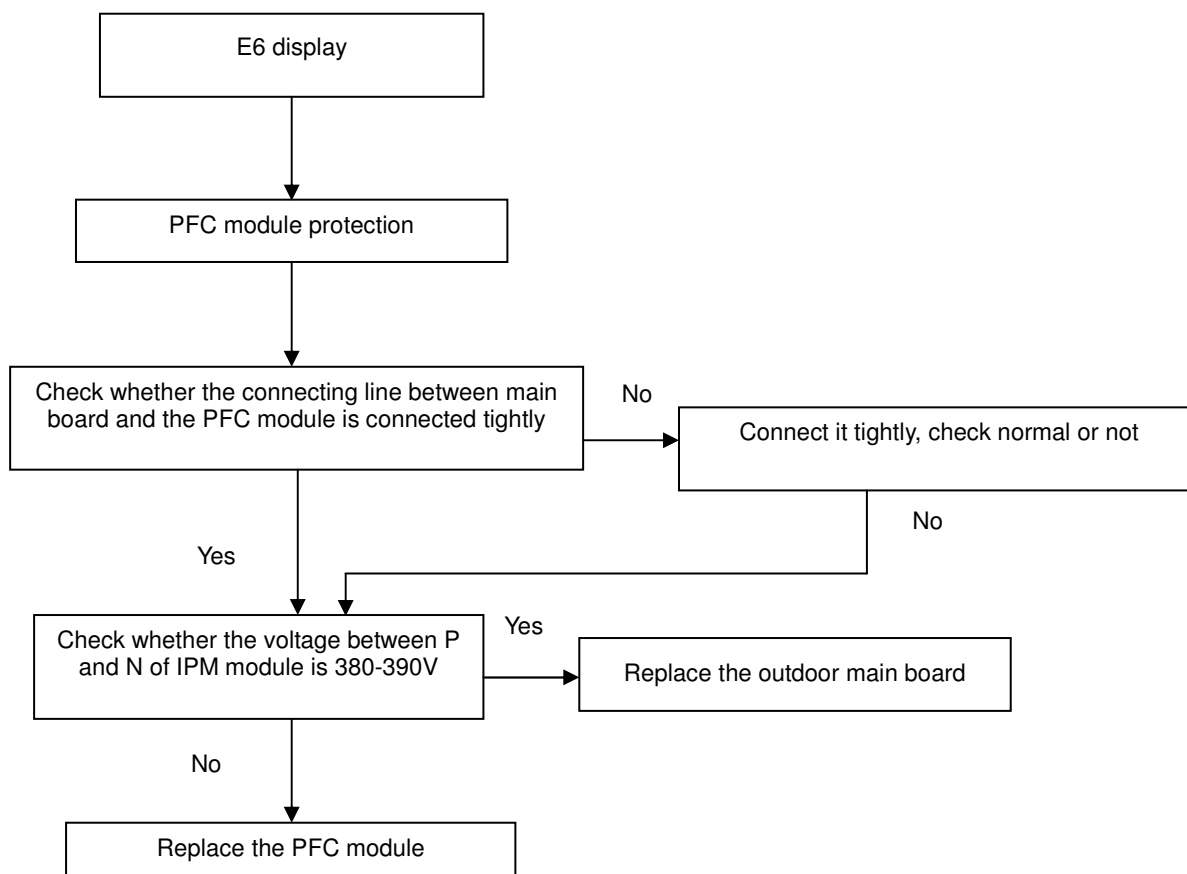
5. E4 malfunction



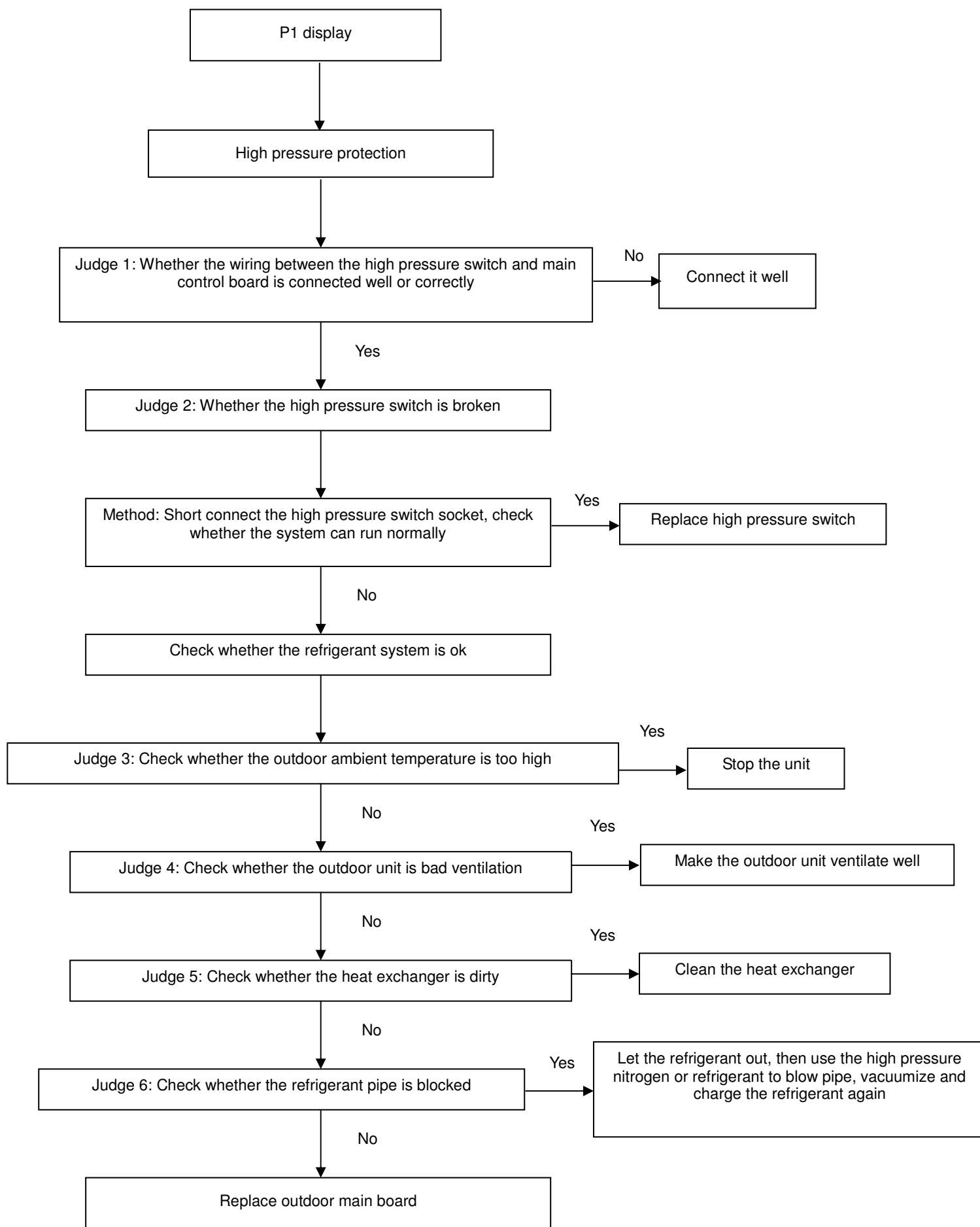
6. E5 malfunction



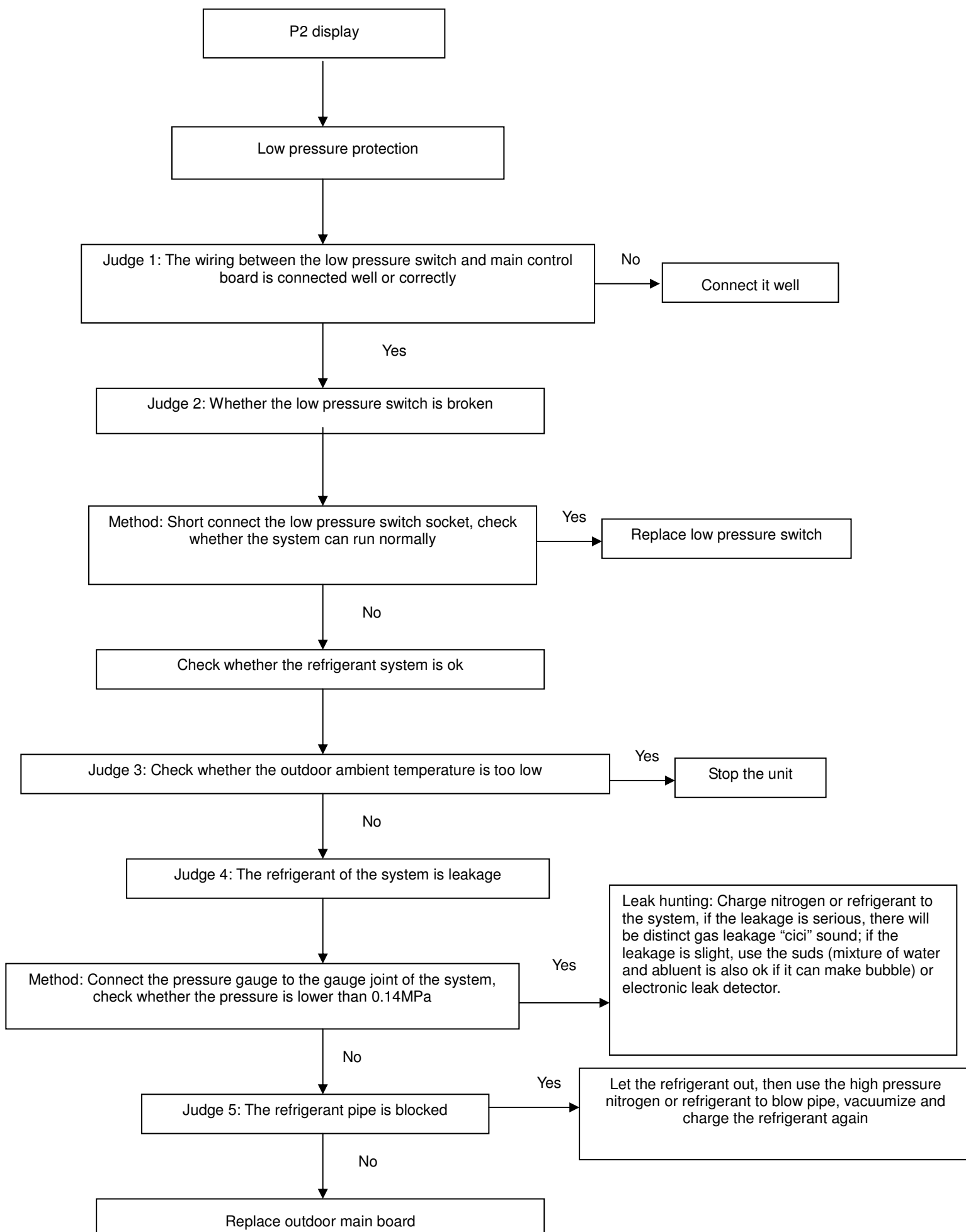
7. E6 malfunction (Only for 30K, 36K & 48K with 1 phase)

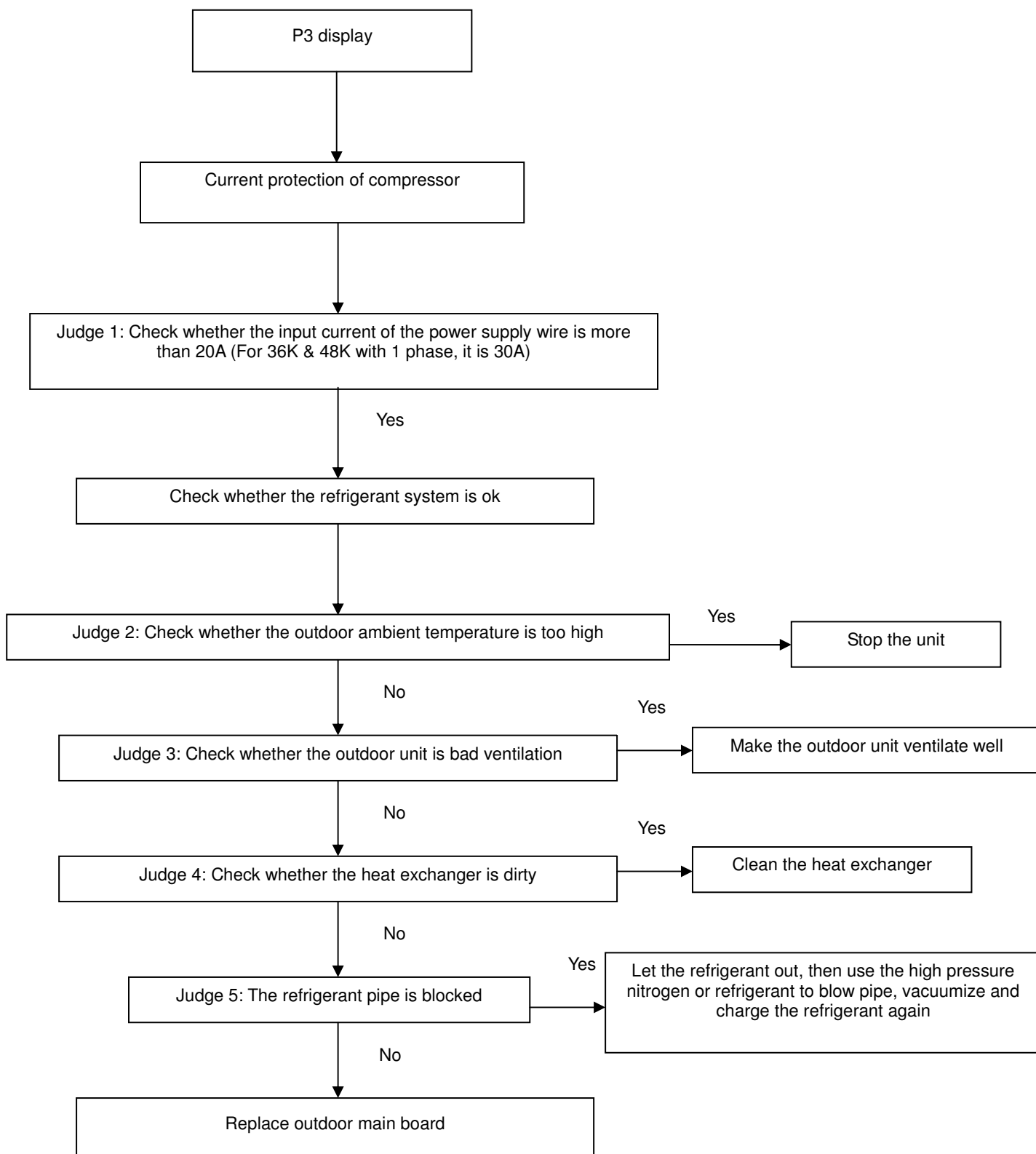


8. P1 malfunction



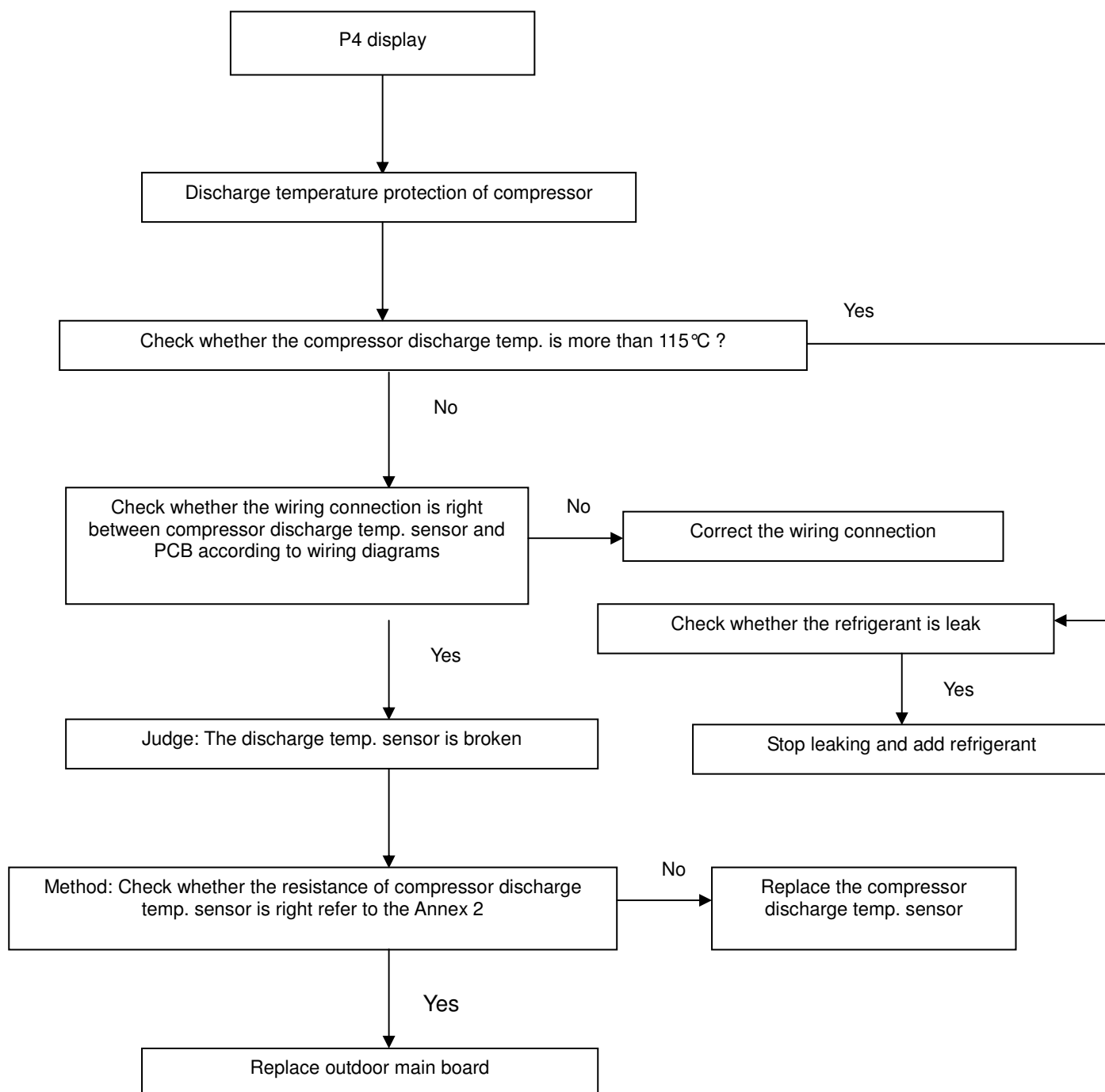
9. P2 malfunction



10. P3 malfunction

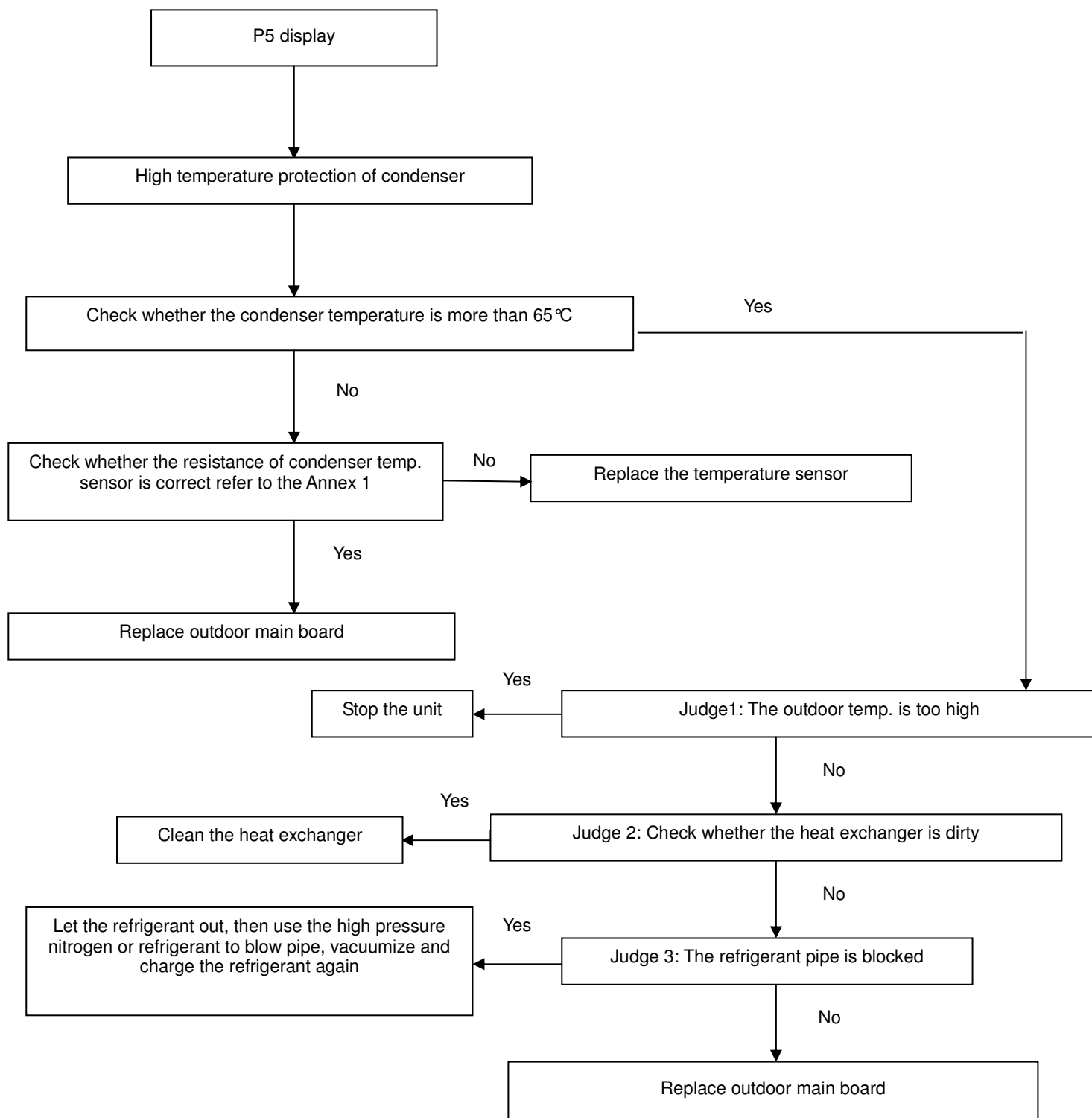
11. P4 malfunction

When compressor discharge temperature is higher than 115°C, the unit will stop, and unit runs again when compressor discharge temperature is lower than 90°C.

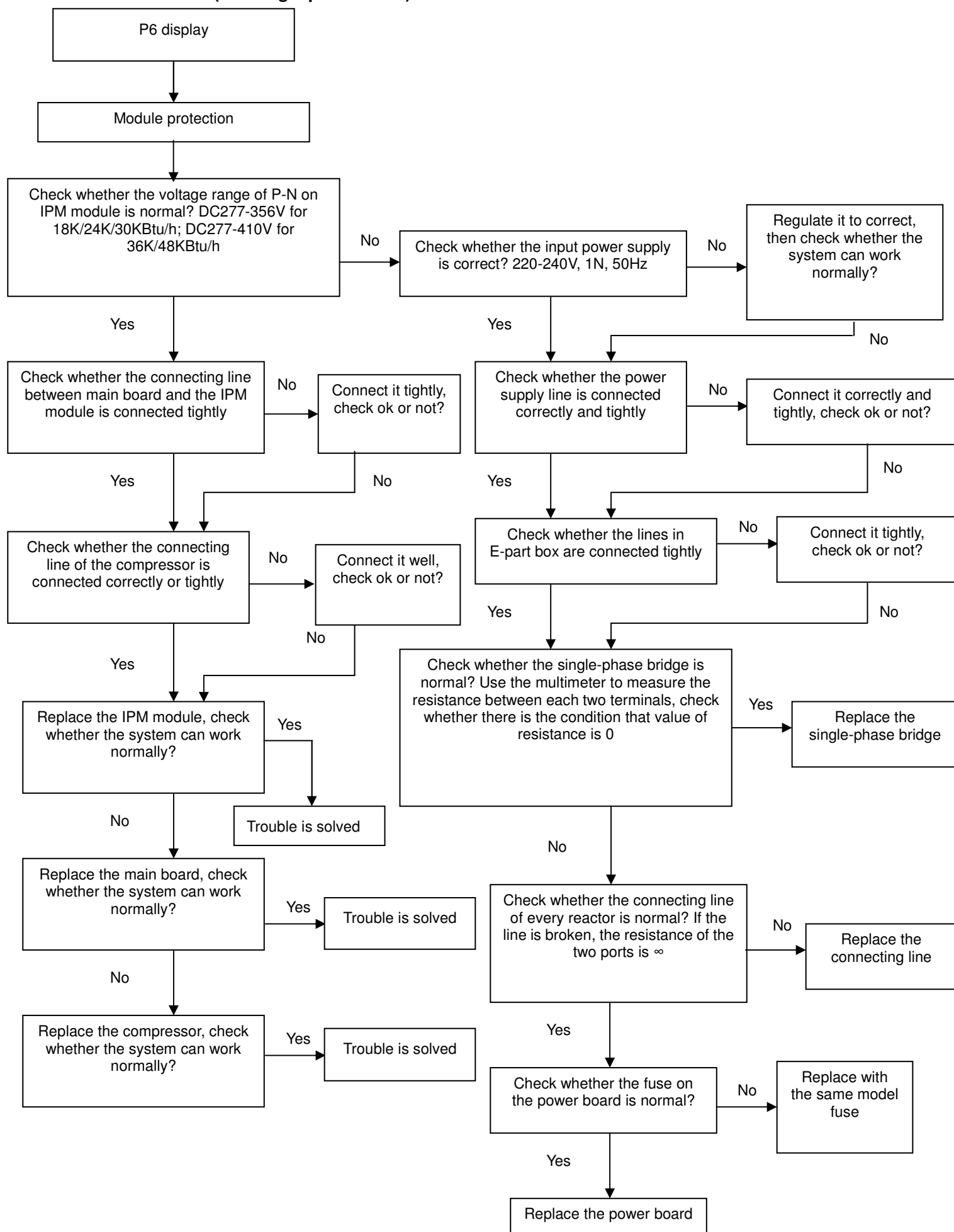


12. P5 malfunction

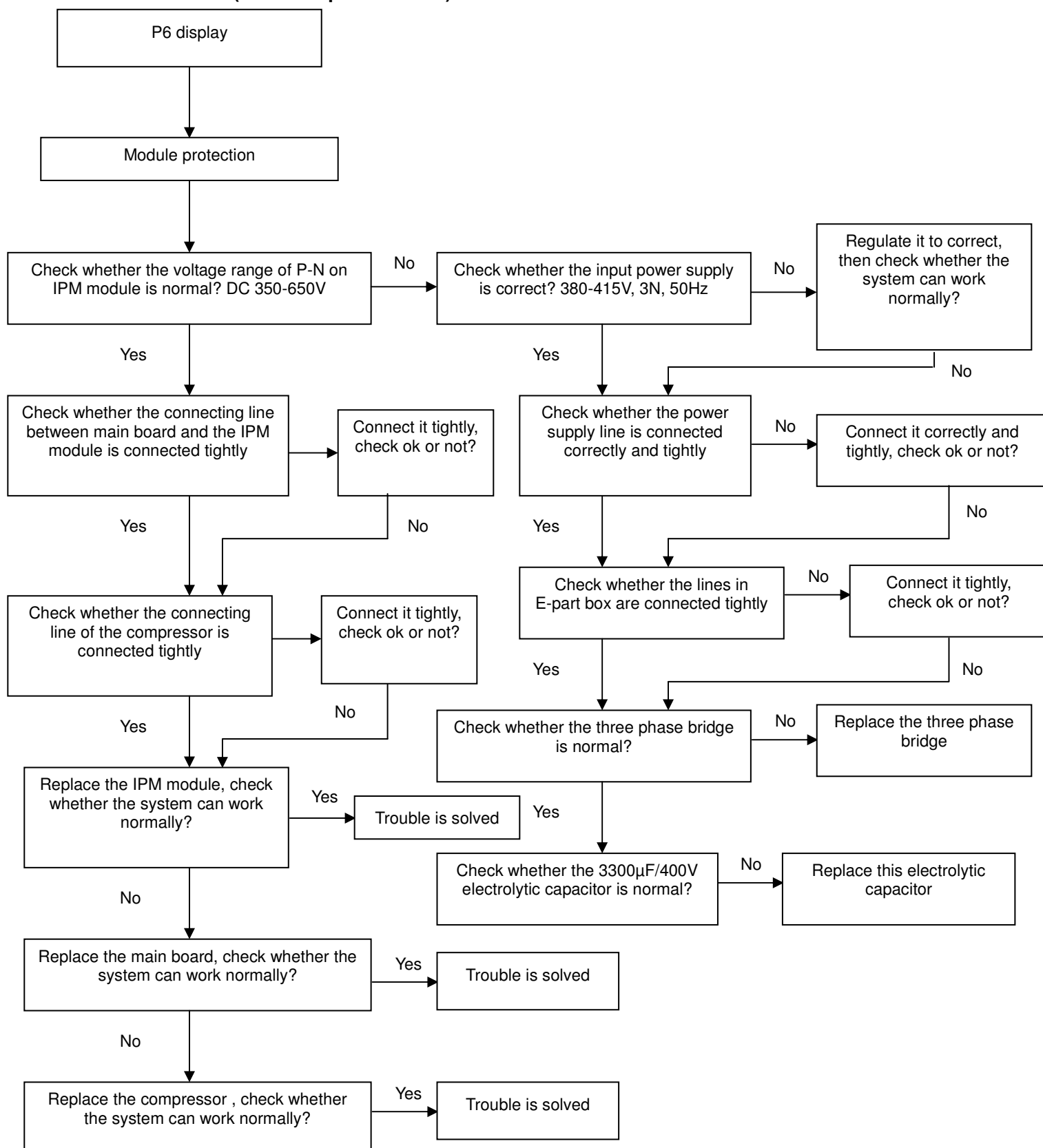
When condenser high temp. is more than 65°C, the unit will stop, and unit runs again when outdoor pipe temp. less than 52°C.



13. P6 malfunction (For single phase units)



14. P6 malfunction (For three phases units)



Wiring

1. Control	220
2. Wiring	221
3. Test operation.....	222

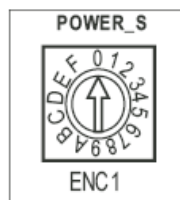
1. Control

- The capacity of the system and the network address of the air-conditioner can be set by the switches on the Main Control Board of the indoor unit.
- After the setting, be sure to cut down the main power supply switch, then turn it on again.
- Setting would be invalid without disconnecting the power.

1.1 Horsepower code set

The capacity of the indoor unit has been set before leaving the factory according to the below table.

Horsepower code



NC1	Toggle switch Code	Capacity(Btu/h)
Note: The capacity has been set before leaving the factory, anyone can't modify it except the maintenance person.	4	18000
	5	24000
	7	30000
	8	36000
	9	48000
	9	60000

1.2 Network address set

Every air-conditioner in network has only one network address to distinguish each other. Address code of air-conditioner in LAN is set by code switches S1 & S2 on the Main Control Board of the indoor unit, and the set range is 0-63.

Toggle switch set		Network address code
S1	S2	
		00~15
		16~31
		32~47
		48~63

2. Wiring

CAUTION

The appliance shall be installed in accordance with national wiring regulations.

The air conditioner should use separate power supply with rated voltage.

The external power supply to the air conditioner should have ground wiring, which is linked to the ground wiring of the indoor and outdoor unit.

The wiring work should be done by qualified persons according to circuit drawing.

An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device (RCD) with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule.

Be sure to locate the power wiring and the signals wiring well to avoid cross-disturbance.

Do not turn on the power until you have checked carefully after wiring.

NOTE

Remark per EMC Directive 89/336/EEC

For to prevent flicker impressions during the start of the compressor (technical process) ,following installation conditions do apply.

1. The power connection for the air conditioner has to be done at the main power distribution. The distribution has to be of a low impedance; normally there required impedance reaches at a 32 a fusing point.
2. No other equipment has to be connected with this power line.
3. For detailed installation acceptance please refer to your power supplier, if restrictions do apply for products like washing machines, air conditioners or electrical ovens.
4. For power details of the air conditioner refer to the rating plate of the product.
5. For any question contact your local dealer.

2.1 Connect the cable

■ Disassemble the bolts from the cover. (If there isn't a cover on the outdoor unit, disassemble the bolts from the maintenance board, and pull it in the direction of the arrow to remove the protection board.) (*Refer to Fig.11-1*)

■ Connect the connective cables to the terminals as identified with their respective marked numbers on the terminal block of indoor and outdoor units.

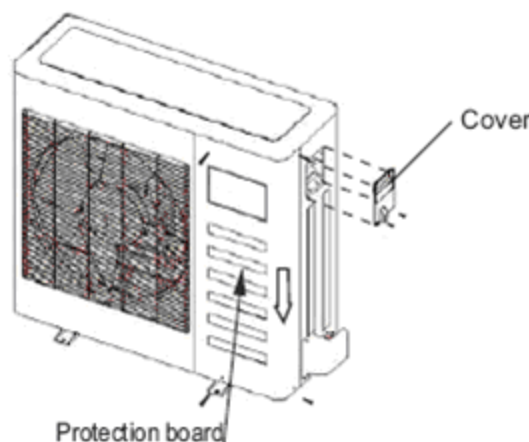
■ Re-install the cover or the protection board.

2.2 The Specification of Power

(*Refer to Table 11-1*)

2.3 Wiring figure

(*Refer to Fig.11-2~Fig.11-3*)



NOTE

All the pictures in this manual are for explanation purpose only. They may be slightly different from the air conditioner you purchased (depend on model). The actual shape shall prevail.

3. Test operation

3.1. The test operation must be carried out after the entire installation has been completed.

3.2. Please confirm the following points before the test operation:

- The indoor unit and outdoor unit are installed properly.
- Tubing and wiring are correctly completed.
- The refrigerant pipe system is leakage-checked.
- The drainage is unimpeded.
- The heating insulation works well.
- The ground wiring is connected correctly.
- The length of the tubing and the added stow capacity of the refrigerant have been recorded.
- The power voltage fits the rated voltage of the air conditioner.
- There is no obstacle at the outlet and inlet of the outdoor and indoor units.
- The gas-side and liquid-side stop valves are both opened.
- The air conditioner is pre-heated by turning on the power.

3.3. According to the user's requirement, install the remote controller frame where the remote controller's signal can reach the indoor unit smoothly.

3.4. Test operation

■ Set the air conditioner under the mode of "COOLING" with the remote controller, and check the following points. If there is any malfunction, please resolve it according to the chapter "Troubleshooting" in the "Owner's Manual".

- 1) The indoor unit
 - a. Whether the switch on the remote controller works well.
 - b. Whether the buttons on the remote controller works Well.
 - c. Whether the air flow louver moves normally.
 - d. Whether the room temperature is adjusted well.
 - e. Whether the indicator lights normally.
 - f. Whether the temporary buttons works well.
 - g. Whether the drainage is normal.
 - h. Whether there is vibration or abnormal noise during operation.
 - i. Whether the air conditioner heats well in the case of the HEATING/COOLING type.
- 2) The outdoor unit
 - a. Whether there is vibration or abnormal noise during operation.
 - b. Whether the generated wind, noise, or condensed of by the air conditioner have influenced your neighborhood.
 - c. Whether any of the refrigerants is leaked.

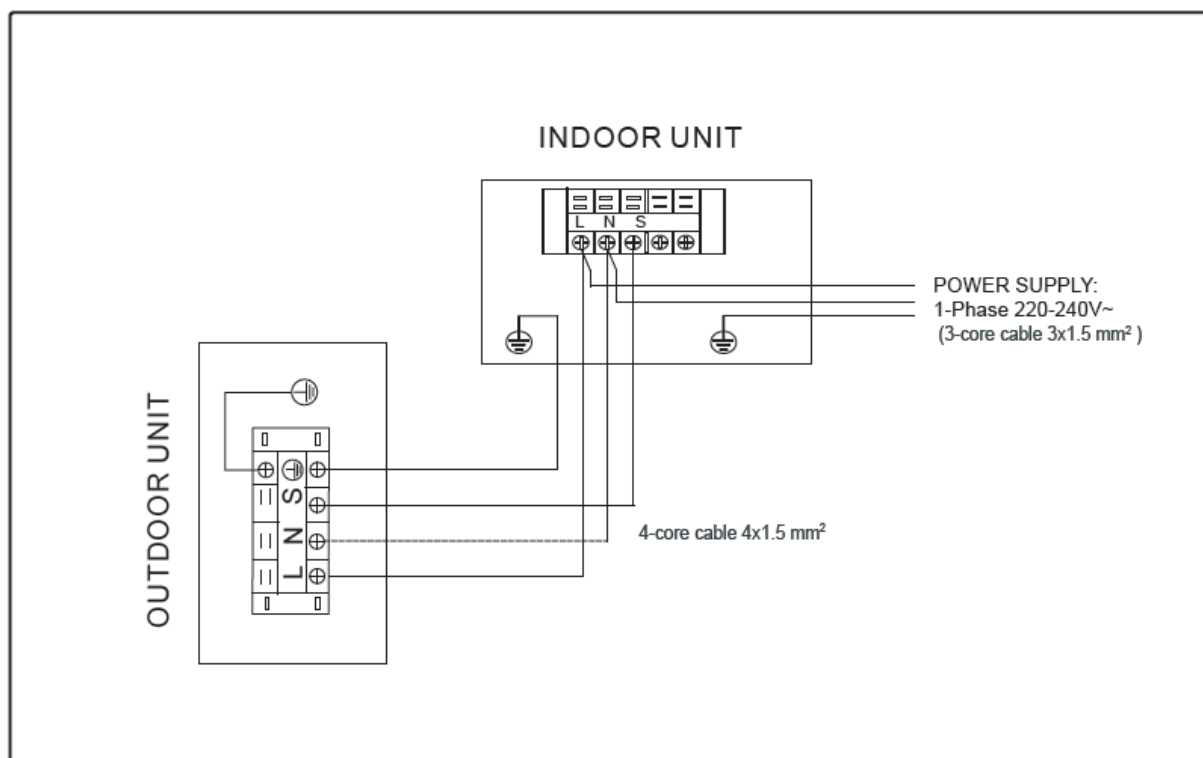
CAUTION

A protection feature prevents the air conditioner from being activated for approximately 3 minutes when it is restarted immediately after shut off.

For ceiling and floor

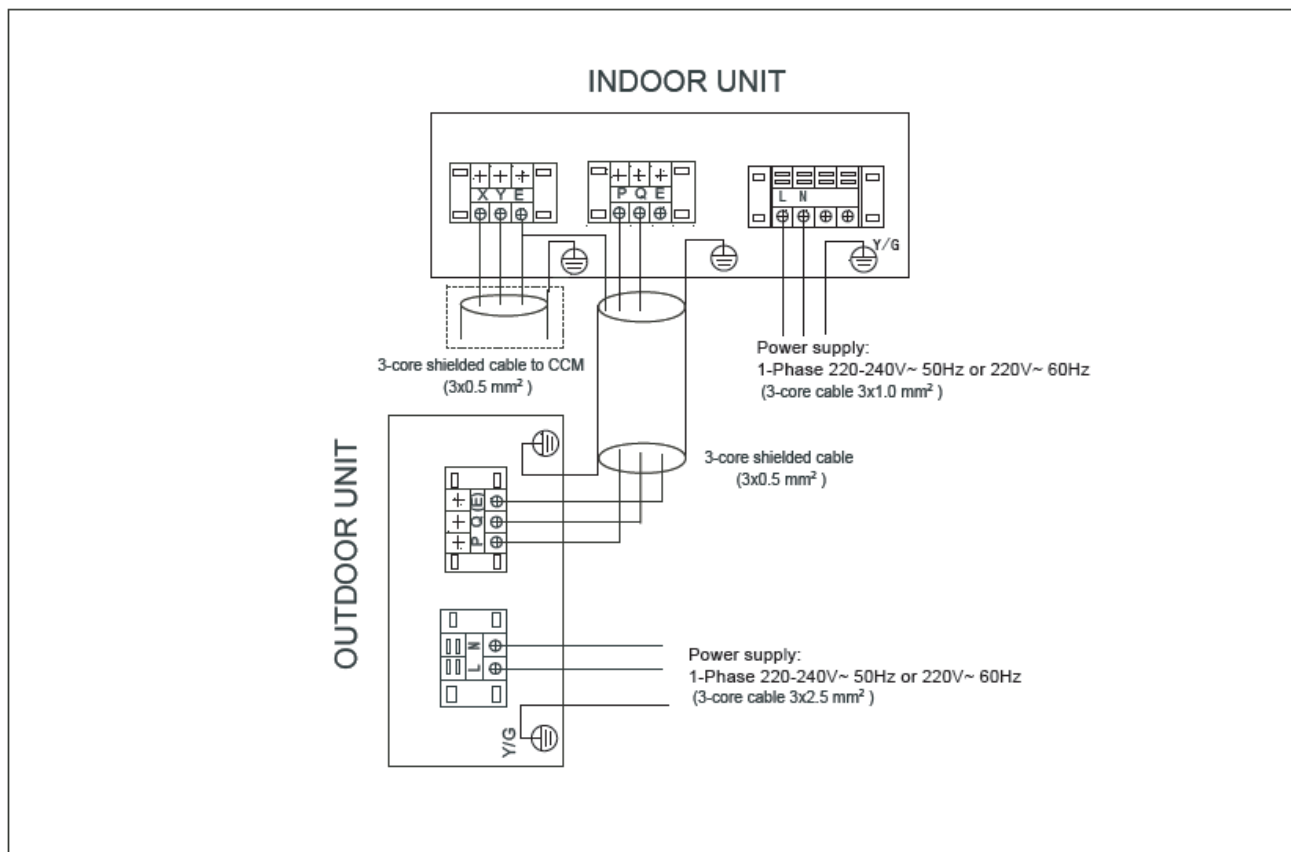
Capacity(Btu/h)		12000	18000-24000
Indoor unit power	PHASE	1-PHASE	1-PHASE
	FREQUENCY AND VOLT	220-240V~, 50Hz	220-240V~, 50Hz
	POWER WIRING(mm ²)	3×1.5	3×1.0
	CIRCUIT BREAKER (A)	20	15
Outdoor unit power	PHASE	—————	1-PHASE
	FREQUENCY AND VOLT	—————	220-240V~, 50Hz
	POWER WIRING(mm ²)	—————	3×2.5
	CIRCUIT BREAKER (A)	—————	30
INDOOR/OUTDOOR CONNECTING WIRING(Weak electric signal) (mm ²)		—————	3×0.5
INDOOR/OUTDOOR CONNECTING WIRING(Strong electric signal) (mm ²)		4×1.5	—————

Capacity(Btu/h)		30000-48000 (with 1-phase outdoor unit)	36000-48000 (with 3-phase outdoor unit)
Indoor unit power	PHASE	1-PHASE	1-PHASE
	FREQUENCY AND VOLT	220-240V~, 50Hz	220-240V~, 50Hz
	POWER WIRING(mm ²)	3×1.0	3×1.0
	CIRCUIT BREAKER (A)	15	15
Outdoor unit power	PHASE	1-PHASE	3-PHASE
	FREQUENCY AND VOLT	220-240V~, 50Hz	380-415V~, 50Hz
	POWER WIRING(mm ²)	3×2.5	5×2.5
	CIRCUIT BREAKER (A)	40	30
INDOOR/OUTDOOR CONNECTING WIRING(Weak electric signal) (mm ²)		3×0.5	3×0.5
INDOOR/OUTDOOR CONNECTING WIRING(Strong electric signal) (mm ²)		—————	—————

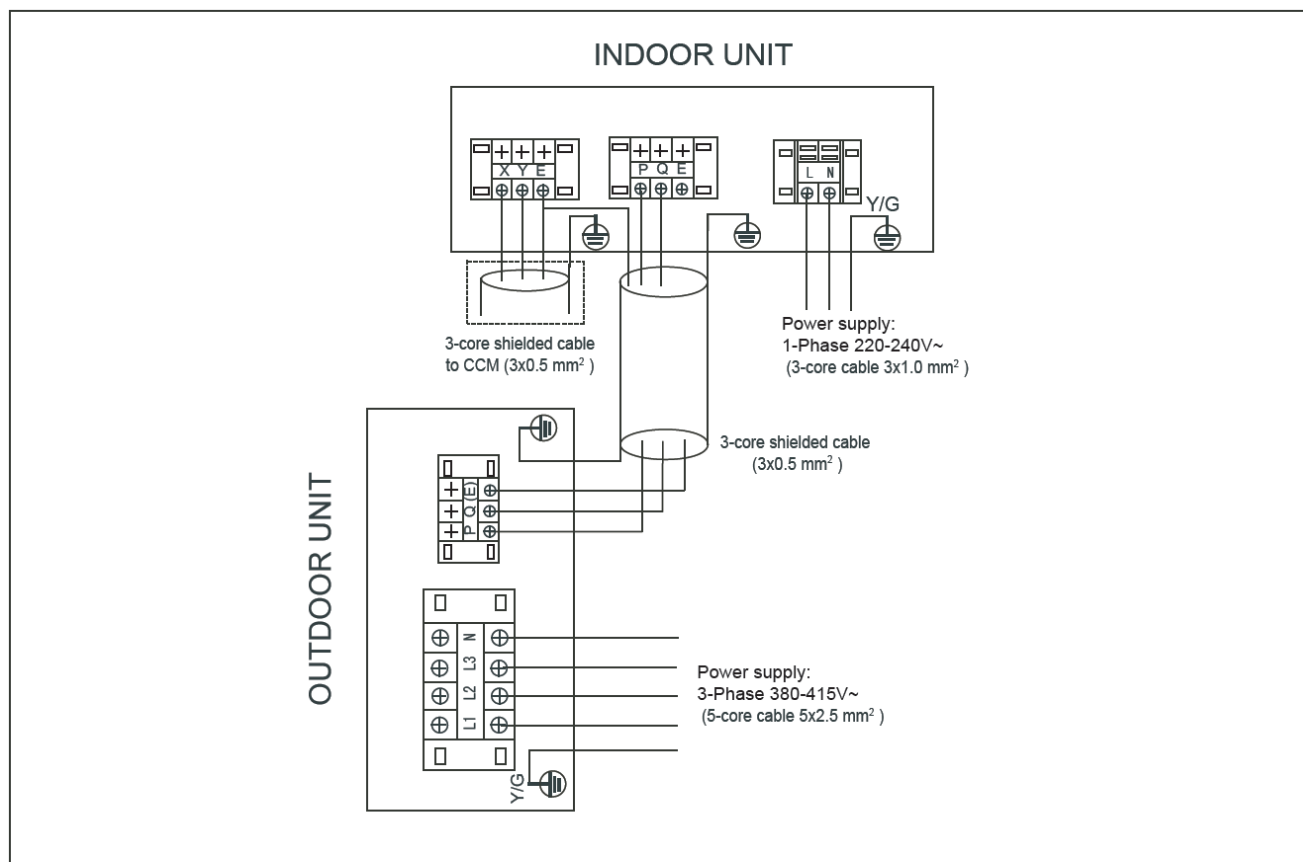


12000Btu/h(with 1-PHASE OUTDOOR UNIT)(1 PHASE,50Hz)

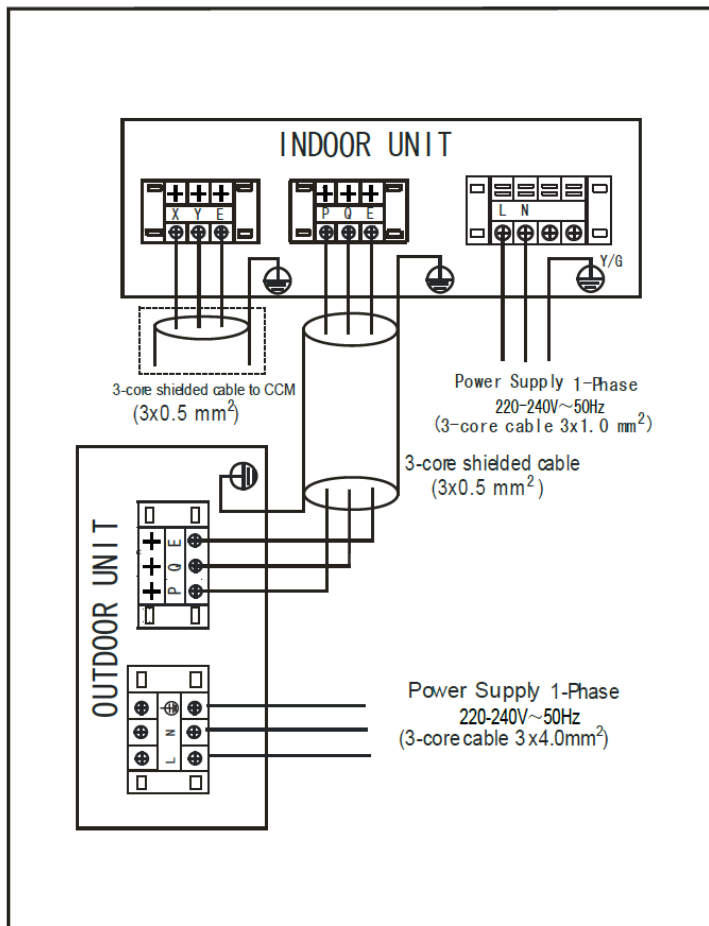
Air Conditioner Link-circuit (For R410A,Cooling& Heating)



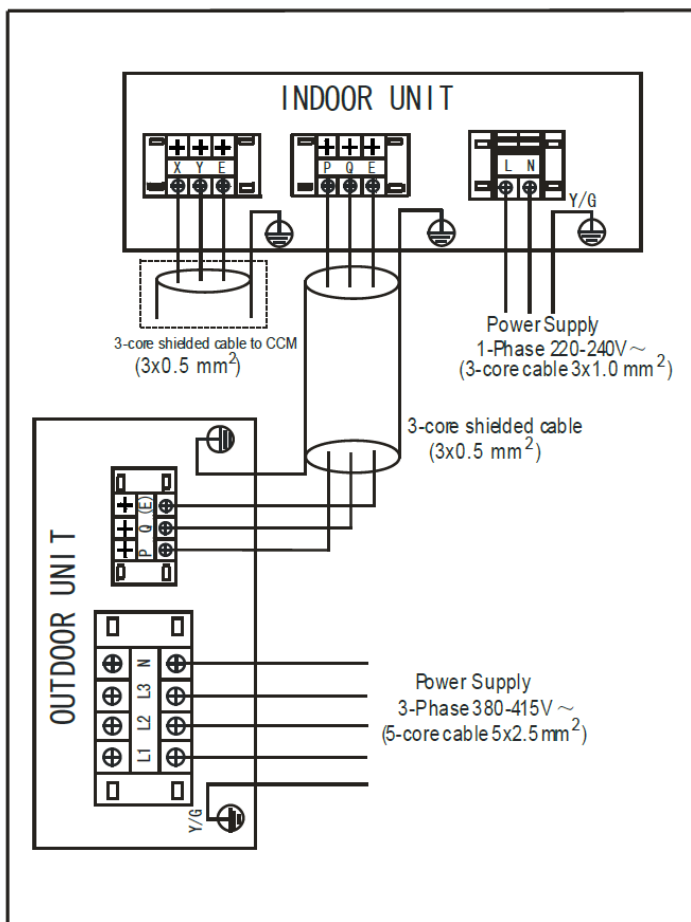
For 18000-60000Btu/h (with 1-Phase outdoor unit)



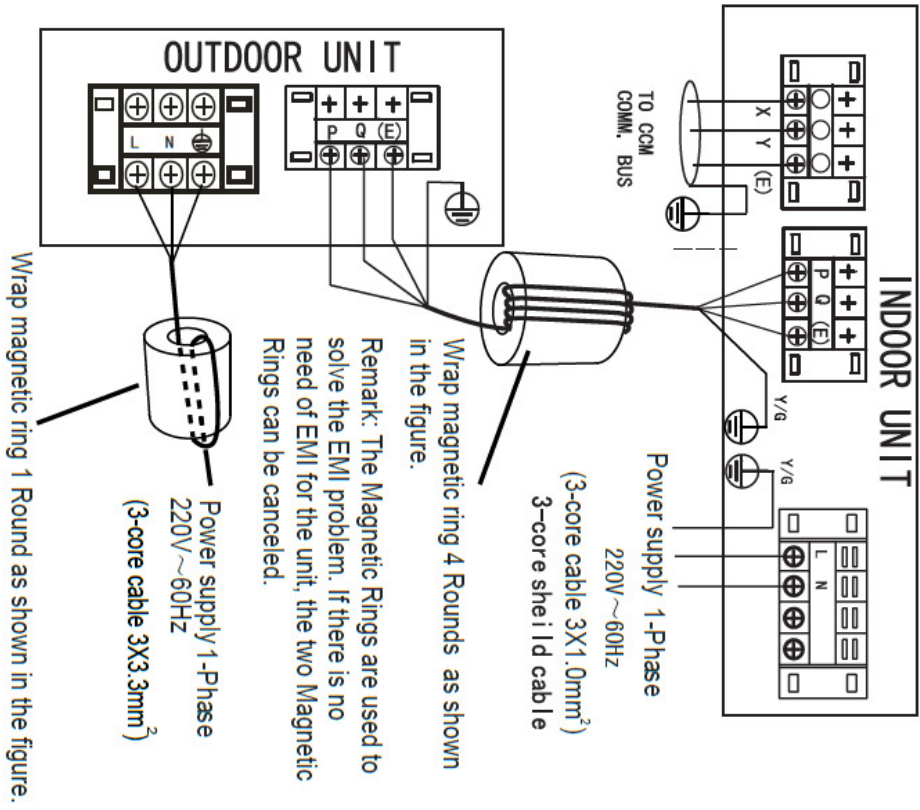
For 36000-60000Btu/h (with 3-Phase outdoor unit)



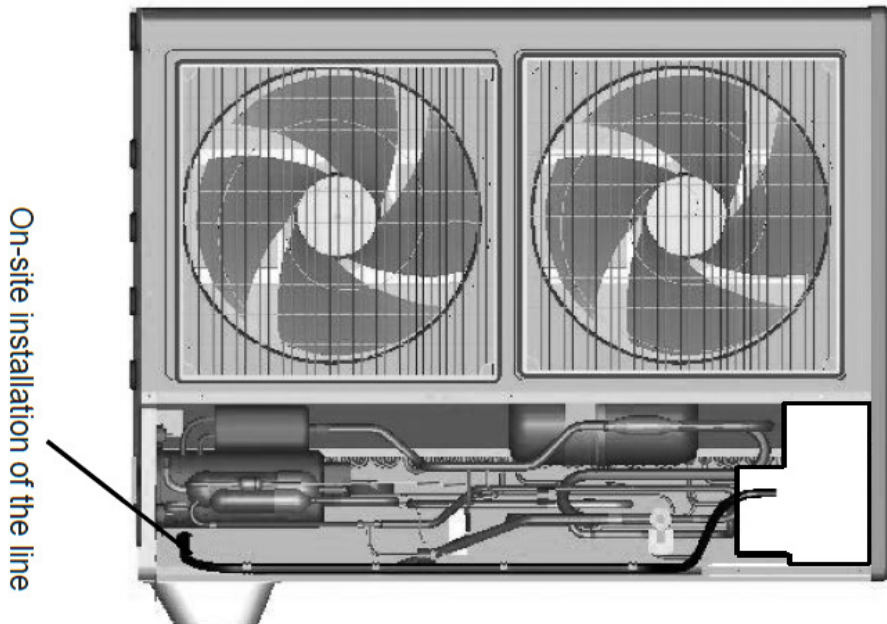
For model 36-48 (with 1-Phase outdoor unit)



For model 36-60 (with 3-Phase outdoor unit)



On-site installation of cable diagram:



Part 5

Control

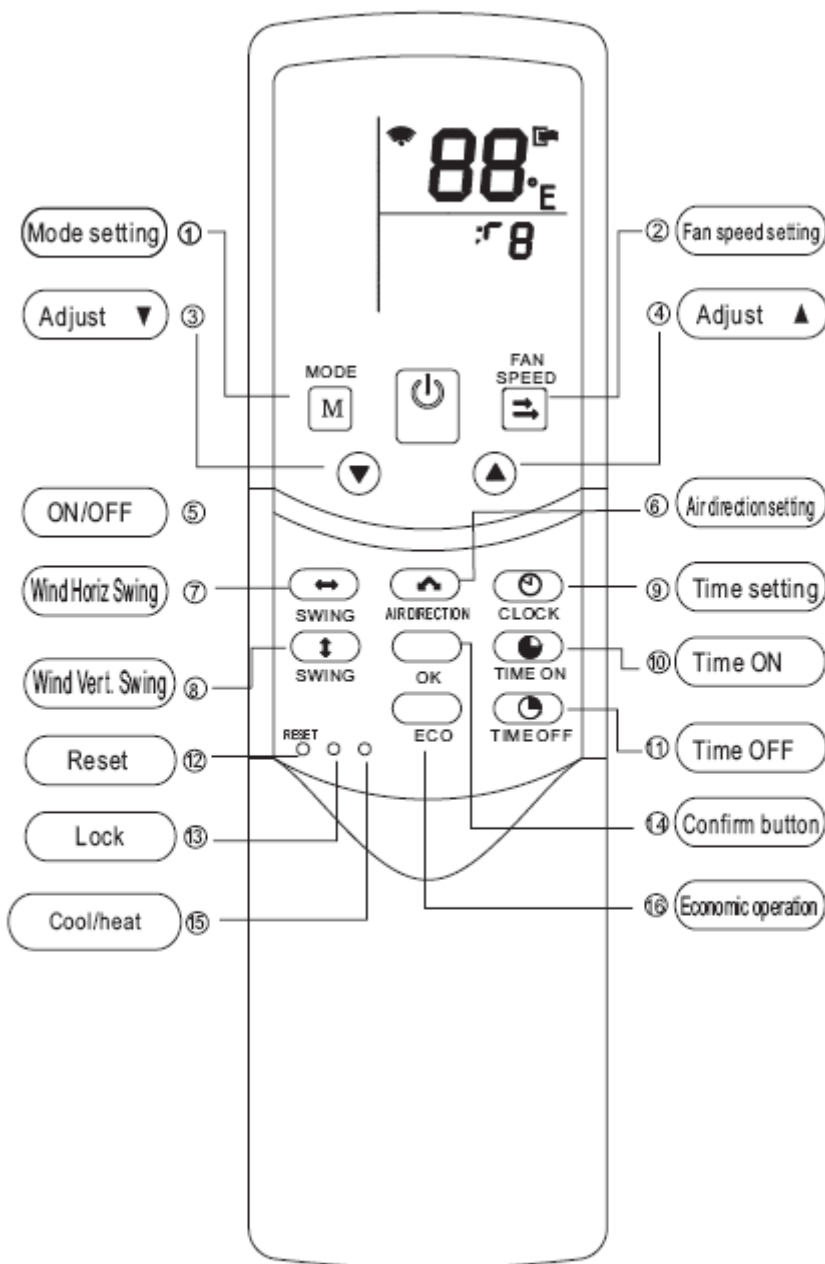
1. Standard Controller.....

1. Standard controller

1.1 Wireless remote controller R05/BGE

This is for all the models of Four-way cassette type and Ceiling & floor type, and this is standard for them.

The below is R05-BG/E wireless remote controller



Visual photo

Note:

1. The outline figure on cover is for reference only, which may differ from what you purchased.
2. Make sure to read chapter PRECAUTIONS before you operate the air conditioner.
3. The content is available for model R05/BG.
4. R05/BGE can be applicable for cool only type and cool & heat type air conditioners.

Precautions

Curtain, door or the similar objects will prevent the remote signal from being received by air conditioner.

Do not get the interior of remote controller wet.

It is forbidden to expose it to direct sunlight or locate it in the place with high temp.

Malfunction may occur if infrared signal receiver on air conditioner is exposed to sunlight.

Please shelter the signal receiver from sunlight with curtain.

Please remove the nearby electronic device for they may affect the performance of remote controller.

Do not put the used or different batteries into the remote controller, otherwise remote controller will fail to send signal.

Please remove the batteries before long period unused, otherwise the remote controller may be damaged.

If pressing the button reset the remote controller, which indicates low battery, please replace the batteries.

If no receiving sound is heard from indoor unit or on remote controller does not flash, please replace the batteries.

Effective transmitting distance of remote controller is 8m, please aim the signal sending part to the receiver on air conditioner.

Model and specification

Model	R05/BGE
Rated voltage	3.0V(2pieces of LR03 7 # batteries)
Min voltage for sending signal of CPU	2.4V
Effective receiving distance	8m~11m
Operation condition	-5~60Φ

Buttons and their functions

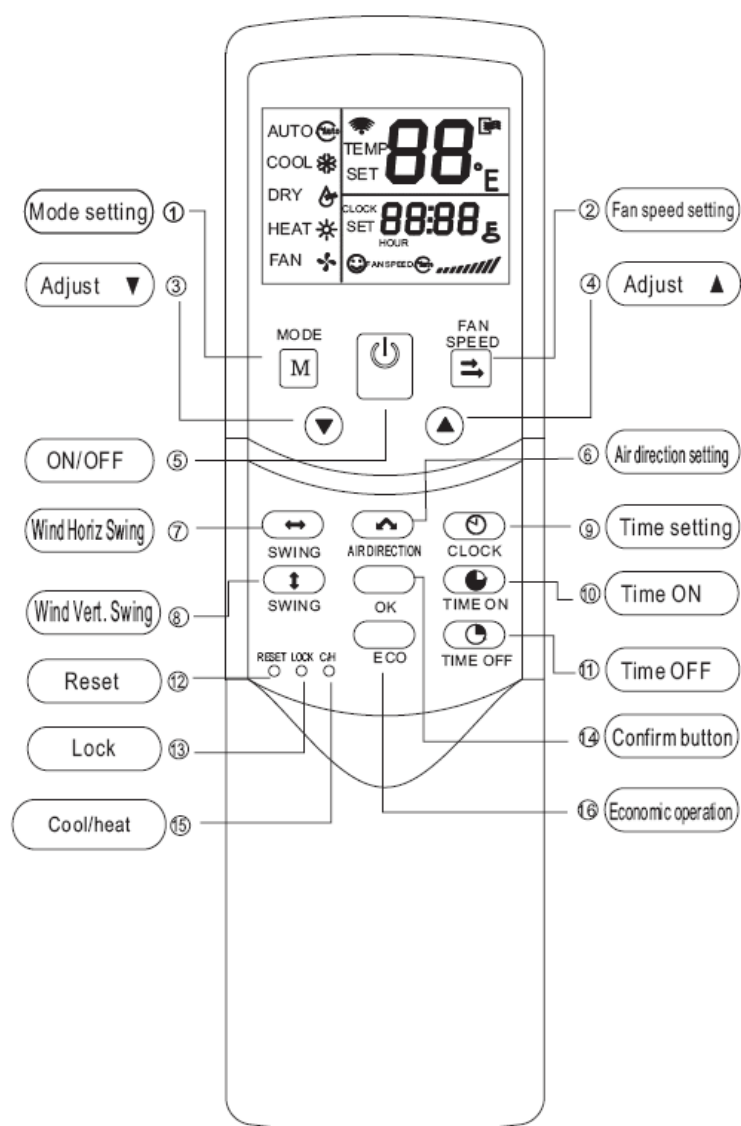
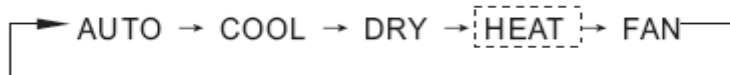


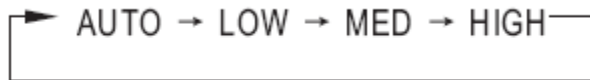
Chart 1

1. MODE: Once pressing, running mode will be selected in the following sequence:



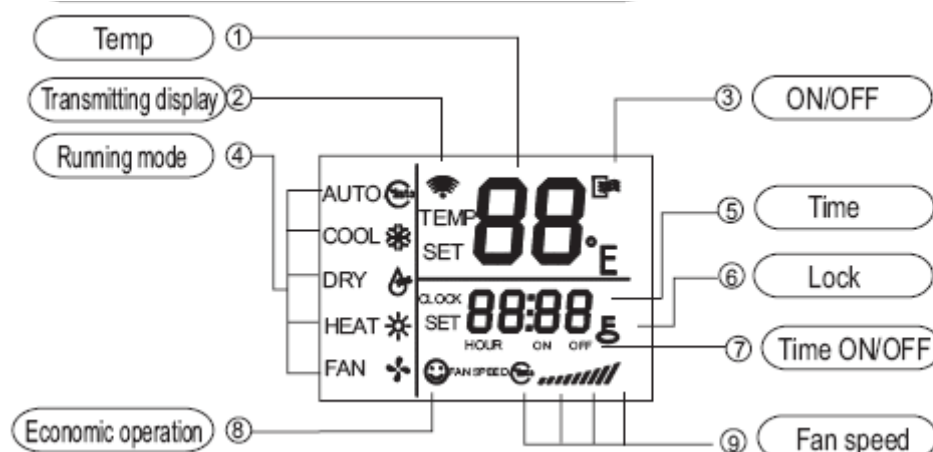
NOTE: No heating mode for cool only type unit.

2. FAN SPEED: Fan speed will be selected in following sequence once pressing this button:



3. Adjust: Decrease the set temp. Keeping pressing will decrease the temp with 1 °C per 0.5s.
4. Adjust: Increase the set temp. Keeping pressing will increase the temp with 1 °C per 0.5s.
5. ON/OFF: For turning on or turning off the air conditioner.
6. AIR DIRECTION: Activate swing function of air deflector. Once pressing, air deflector will turn 6 °C. For normal operation and better cooling and heating effect, deflector will not turn to the degree which is the state of deflector when the unit is turned off. (Only available when remote controller is used with corresponding unit.)
7. Wind Horizontal Swing: Activate or turn off wind horizontal swing function. (Only available when remote controller is used with corresponding unit.)
8. Wind Vertical Swing: Activate or turn off wind vertical swing function. (Only available when remote controller is used with corresponding unit.)
9. CLOCK: Display the current time. (12:00 is displayed when resetting or electrifying for the first time.) Press CLOCK for 5s, icon indicating hour will flash with 0.5s. Press it again, icon indicating minute will flash with 0.5s. and are used to adjust the figure. Setting or modification is effective only by pressing OK button to make confirmation.
10. TIME ON: For time ON setting. Once pressing this button, the time will increase by 0.5 hour. When the set time exceeds 10 hours, pressing the button will increase the time by 1 hour. Adjusting the figure to 0.00 will cancel time ON setting.
11. TIME OFF: For time OFF setting. Once pressing this button, the time will increase by 0.5 hour. When the set time exceeds 10 hours, pressing the button will increase the time by 1 hour. Adjust the figure to 0.00 will cancel time ON setting.
12. RESET (inner located): Press this button with a needle of 1mm to cancel the current setting and reset remote controller.
13. LOCK (inner located): Press this button with a needle of 1mm to lock or unlock the current setting.
14. OK: Used to confirm the time setting and modification.
15. COOL/HEAT (inner located): Press this button with a needle of 1mm to shift mode between COOL only and COOL&HEAT. During setting, back light will be lightened. Factory default mode is COOL & HEAT.
16. ECO: Activate or turn off economic operation mode. It is suggested to turn on this function when sleeping. (Only available when remote controller is used with corresponding unit.)

Indicators and functions



1. Temp: Display the set temperature. Adjust temperature via and No display in this area if the unit is on FAN mode.

2. Transmitting display: The icon will flash once when the signal is sent by remote controller.
3. ON/FF: Icon is displayed when the remote controller is turned on, or vice versa.
4. Running mode: Press MODE to display current running mode. AUTO, COOL, DRY, HEAT and FAN can be selected. (HEAT function is invalid for cool only type unit.)
5. Time: Display the current set time. Press CLOCK for 5s, icon indicating hour will flash. Press this button again, icon indicating minute will flash. And are used to adjust the figure. Setting or modification is effective only by pressing OK button to make confirmation.
6. Lock: The icon will be lightened or off when pressing LOCK. In locked state, all the buttons are ineffective except button LOCK.
7. Time ON/OFF: In the state of time ON, icon ON will be lightened, which is the same to the state of time OFF. Setting timer ON and OFF simultaneously, both icons ON and OFF are displayed.
8. Fan speed: Press FAN SPEED to display the current wind speed. AUTO, LOW, MED and HIGH can be selected. The default state is high fan speed for the unit without medium fan speed.
9. Economic operation: This icon will be lightened or off when pressing ECO button.

NOTE: All the above icons will be displayed only when the remote controller is electrified for the first time or reset.

OPERATION INSTRUCTIONS

Install and replace batteries

Install 2 pieces of 7# alkaline batteries.

Slide the cover to install batteries and make sure to place them in right pole.

AUTO operation

Switch on the power and running indicator light on indoor unit flashes.

1. Press MODE to select AUTO.
2. Adjust temp via and. Generally the range is 17°C ~30°C.
3. Press ON/OFF and running indicator light on indoor unit is lightened. Air conditioner will work on AUTO mode and fan speed is AUTO which is nonadjustable.
4. ECO is effective on AUTO operation.

COOL/HEAT/FAN operation

1. Press MODE to select COOL, HEAT or FAN.
2. Adjust temp via and. Generally the range is 17°C ~30°C.
3. Press FAN SPEED to select AUTO, LOW, MED or HIGH.
4. Press ON/OFF and running indicator light on indoor unit is lightened. Air conditioner will work on the set mode. Stop operation via ON/OFF.

To adjust the figure. Setting or modification is effective only by pressing OK button to make confirmation.

NOTE: On FAN mode, temp is nonadjustable and ECO is ineffective. Procedure 2 is omitted.

DRY operation

1. Press MODE to select DRY.
2. Adjust temp via and. Generally the range is 17°C ~30°C.
3. Press ON/OFF and running indicator light on indoor unit is lightened. Air conditioner will work on DRY mode. Turn off the unit via ON/OFF.
4. On DRY mode, ECO and FAN SPEED are unavailable.

Timer operation

TIME ON and TIME OFF are used to turn on and turn off the unit at the set time respectively.

TIME ON operation

1. Press TIME ON, icon SET, HOUR and ON are lightened.
2. Press TIME ON again and adjust the time.
3. Keep pressing this button, the time will increase by 0.5 hour. When the set time exceeds 10 hours, pressing the button will increase the time by 1 hour.
4. 0.5s after setting, remote controller will send TIME ON command to the unit.

TIME OFF operation

1. Press TIME OFF, icon SET, HOUR and OFF are lightened.
2. Press TIME OFF again and adjust the time.
3. Keep pressing this button, the time will increase by 0.5 hour. When the set time exceeds 10 hours, pressing the button will increase the time by 1 hour.
4. 0.5s after setting, remote controller will send TIME OFF command to the unit.

Set TIME ON and TIME OFF simultaneously

1. Set TIME ON according to procedures 1 and 2 specified in TIME ON operation.
2. Set TIME OFF as the procedures 1 and 2 specified in TIME OFF operation.
3. If both the set time of TIME ON and TIME OFF not exceed 10 hours, time OFF operation will activated 0.5 hour later than time ON operation. If both the set time of TIME ON and TIME OFF exceed 10 hours, time OFF operation will be activated 1 hour later than time ON operation.
4. 0.5s after setting, remote controller will send TIME ON command to the unit.

Modification of timer operation

Press corresponding button and readjust the time of time ON and time OFF. Adjust the time figure to 0.00 to cancel the timer operation.

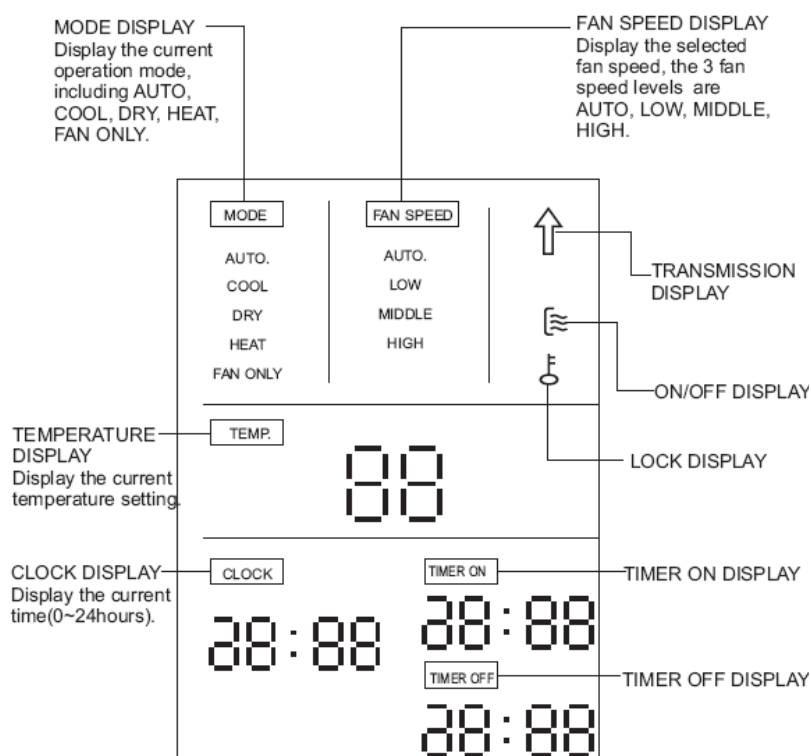
NOTE: The time set in timer operation is the relative figure based on the clock on remote controller. Adjusting clock is unavailable when TIME ON or TIME OFF is activated

2. Optional Controller

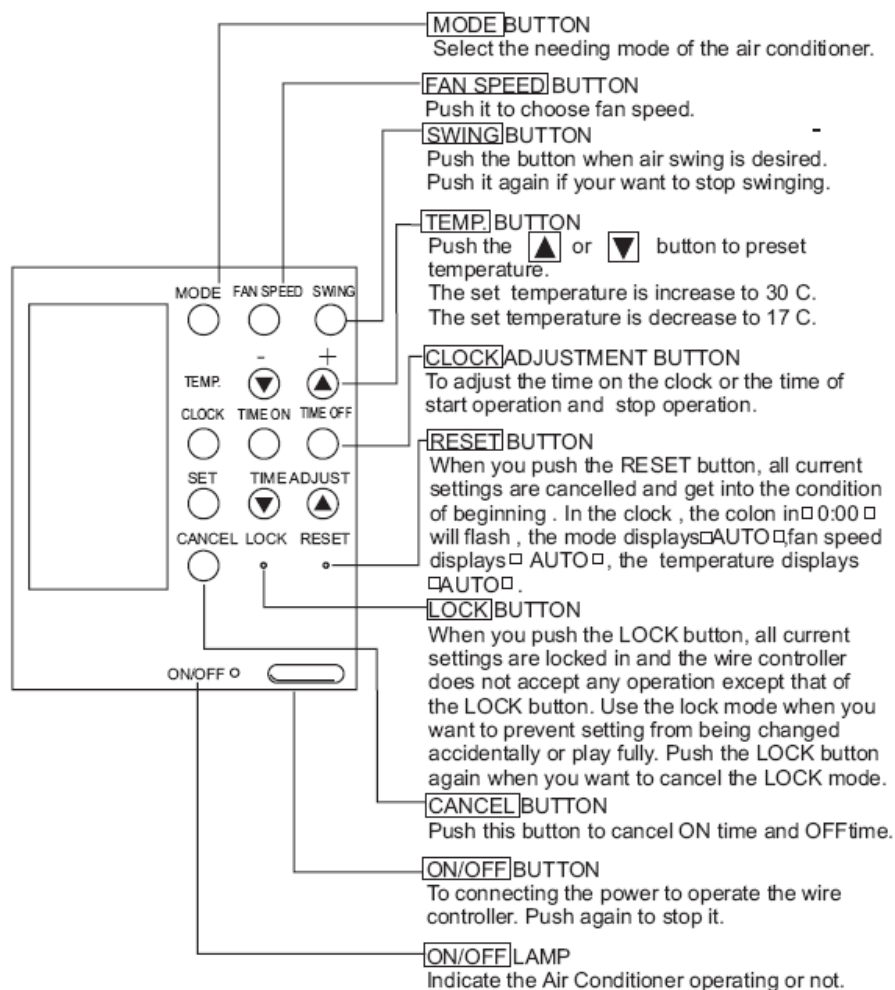
2.1 The below is KJR-01B wired remote controller



NAME AND FUNCTION OF INDICATORS ON THE WIRE CONTROLLER



WIRE CONTROLLER AND THEIR FUNCTIONS



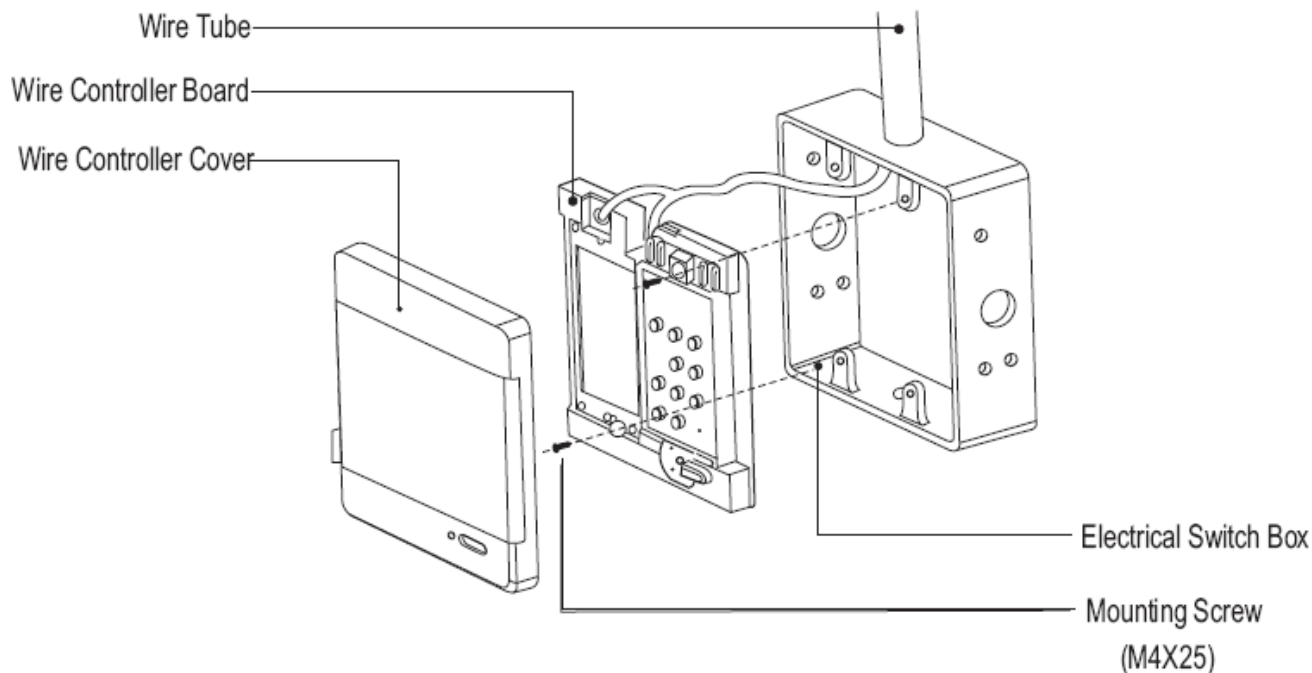
Installation

Installation into the wall

The diameter of Wire Controller wire must be suitable for its length.

Wiring Tube must be suitable for the wires.

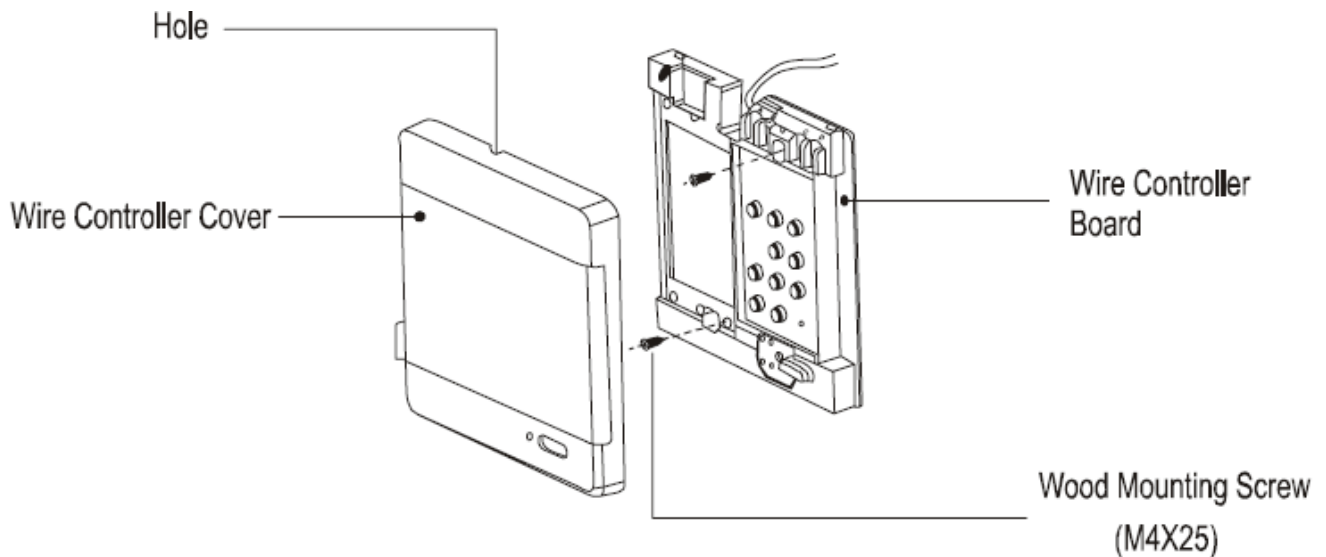
Turn a screwdriver at the concave on bottom panel of the Wire Controller to remove the Cover.



NOTE

- Never turn screws too tightly, or else the cover would be dented, or the Liquid Crystal breaks.
- Do not cut wires when installing Wire Controller cover.

Installation on the wall Cut a hole that can let a Three-core Rubber Insulating Screen Cable pass by from the middle of Wire Controller Top Cover before installation.



Refer to Electrical Switch Box Installation above for other installation information you need. Use Clue around the Screen Cables and the Hole for sealing after installation completed.

NOTE

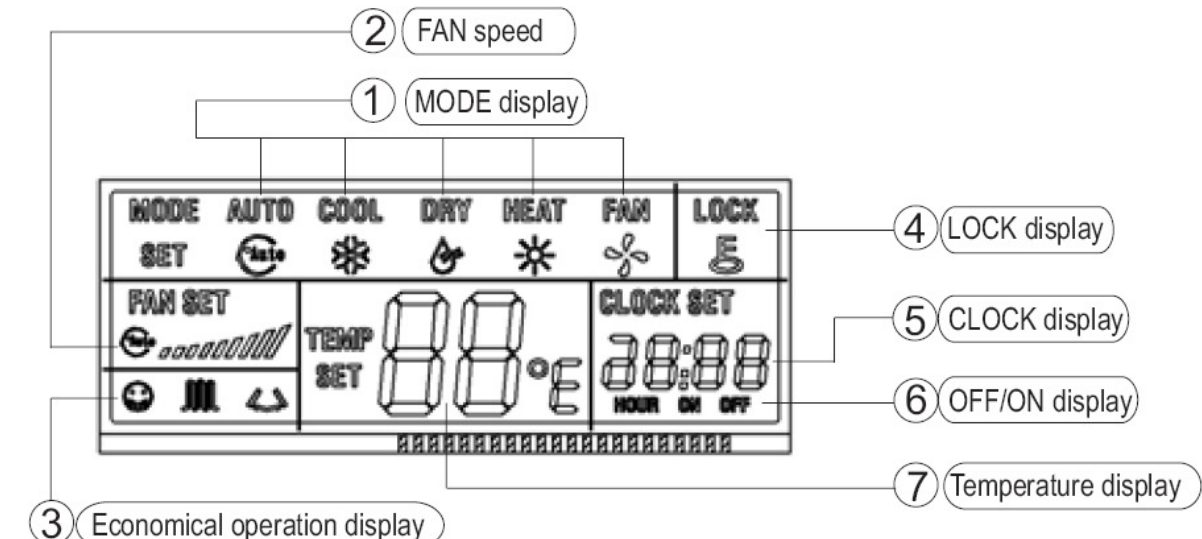
- Never turn screws too tightly, or else the cover would be dented or the Liquid Crystal breaks.
- Do not cut wires when installing Wire Controller Cover.
- Please leave enough long cable for maintenance of the Wire Controller Board.

2.2 The below is KJR-10B wired remote controller

For Duct type, it is standard.



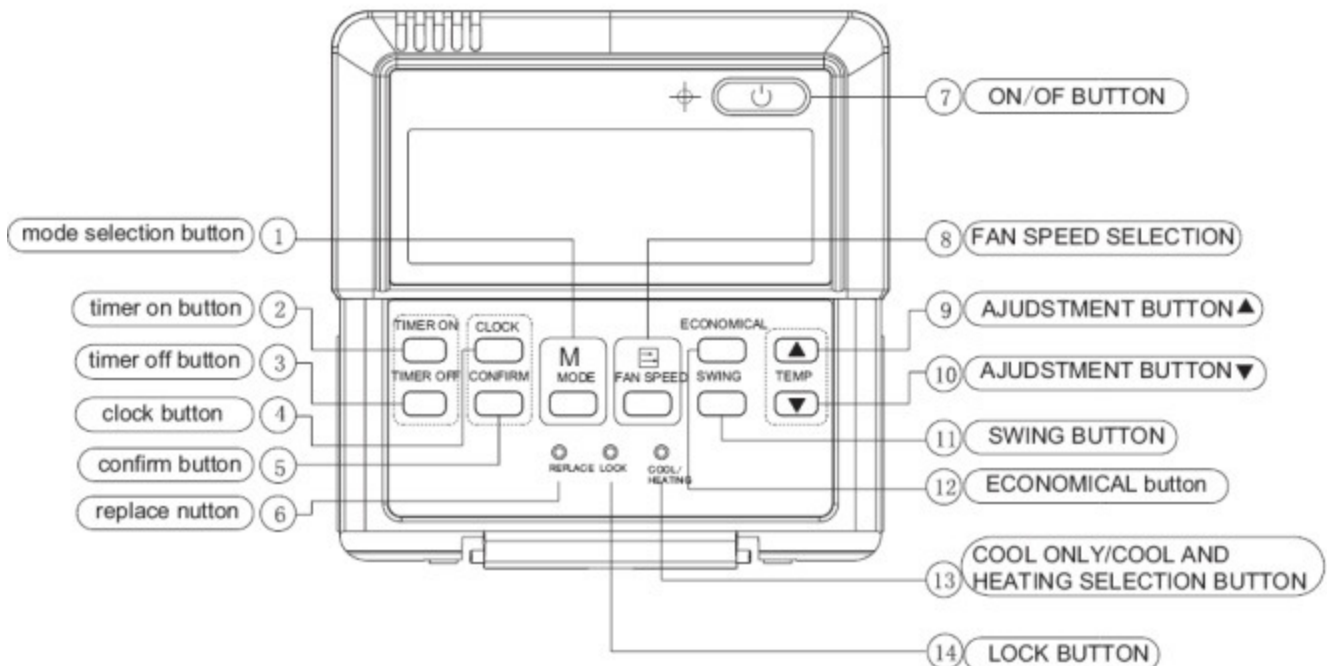
NAME AND FUNCTION OF LCD ON THE WIRE CONTROLLER



- 1 Mode select button (MODE):
Press MODE button to select "COOL", "DRY", "HEAT", or "FAN ONLY" mode. (HEAT is invalid for COOL ONLY wire controller.)
AUTO → COOLING → DEHUMIDIFY → HEATING → FAN
- 2 Fan speed button (FAN SPEED)
Press FAN SPEED to select fan speed from "AUTO", "LOW", "MED", and "HIGH". NOTE: some air conditioners have no MED fan speed, and then the MED is regarded as HIGH.
- 3 Economical operation displays:
Press ECONOMICAL to display economical operation, if press ECONOMICAL again then the display disappears
- 4 Lock display
Press LOCK to display the icon of LOCK. Press the button again then the icon of LOCK disappears. In the mode of LOCK, all the buttons are invalid except for LOCK button.

- 5 **CLOCK display.**
Usually display the clock set currently. Press the button CLOCK for 4 seconds, the HOUR part will flash, press button ▲ and ▼ to adjust HOUR. Press the button CLOCK again, the minute part flash, press button▲ or▼ to adjust MINUTE. After clock set or clock operation, it must press CONFIRM to complete the set.
- 6 **TIMER ON/OFF display:**
Display ON at the state of TIMER ON adjustment or after only set the TIMER ON; Display OFF at the state of TIMER OFF adjustment or after only set the TIMER OFF; Display ON/OFF if simultaneously set the mode of TIMER ON and TIMER OFF.
- 7 **Temperature display area:**
Usually display the set temperature. Press the buttons of and to set temperature, at the mode of FAN, there is no figure display in the area.

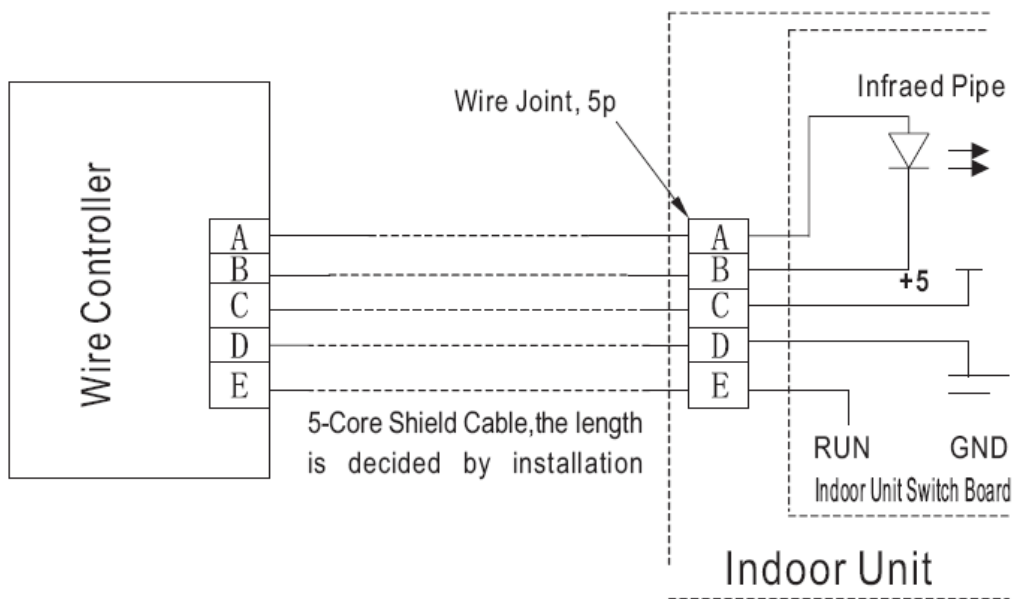
NAME AND FUNCTIONS OF BUTTONS ON WIRE CONTROLLER



- 1 **mode selection button:**
It is used to select mode, push the button one time, then the operation modes will change In turn as follows:
AUTO→ COOLING →DEHUMIDIFY →HEATING→ FAN
Remark: no heating mode if wire controller is set as the cool only.
- 2 **Timer on button:**
Push the button to set TIMER ON, each time you push the button the time moves forward by 0.5 hours. When the set time is over 10 hours, each time you push the button the time moves forward by 1 hour. If want to cancel the TIMER ON, then adjust the time of TIMER ON as 0.0
- 3 **Timer off button:**
Push the button to set TIMER OFF, each time you push the button the time moves forward by 0.5 hours. When the set time is over 10 hours, each time you push the button the time moves forward by 1 hour. If want to cancel the TIMER OFF, then adjust the time of TIMER OFF as 0.0
- 4 **CLOCK button:**
Normally display the clock set currently (display 12:00 for the first electrifying or resetting). When push the button for 4 seconds, the hour part on the clock display flashes every 0.5 seconds, then push button and to adjust hour; push the button CLOCK again, the minute part flashes every 0.5 seconds, then push and button to adjust minute. When set clock or alter clock setting, must push the confirm button to complete the setting

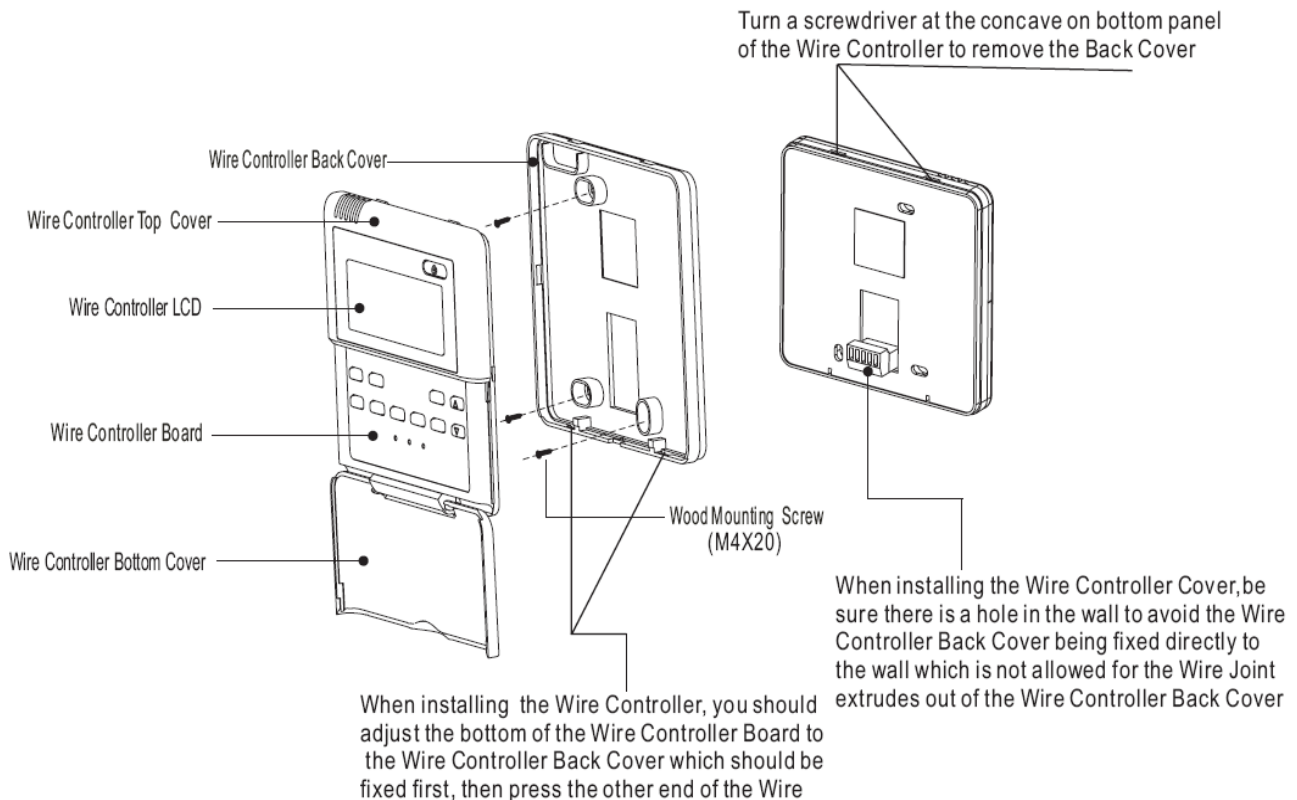
Installation

Wiring Principle Sketch:



Installation Notice:

When the air conditioner needs the constant frequency wire Controller, be sure adding a Wire Joint with 5 terminal named A, B, C, D, E in indoor unit, and fixing a infrared emitter whose anode and cathode connecting with A and B near the receiver in the Indoor Unit Switch Board, then connecting the terminal +5v, GND, Run in the Switch Board to C,D,E respectively.



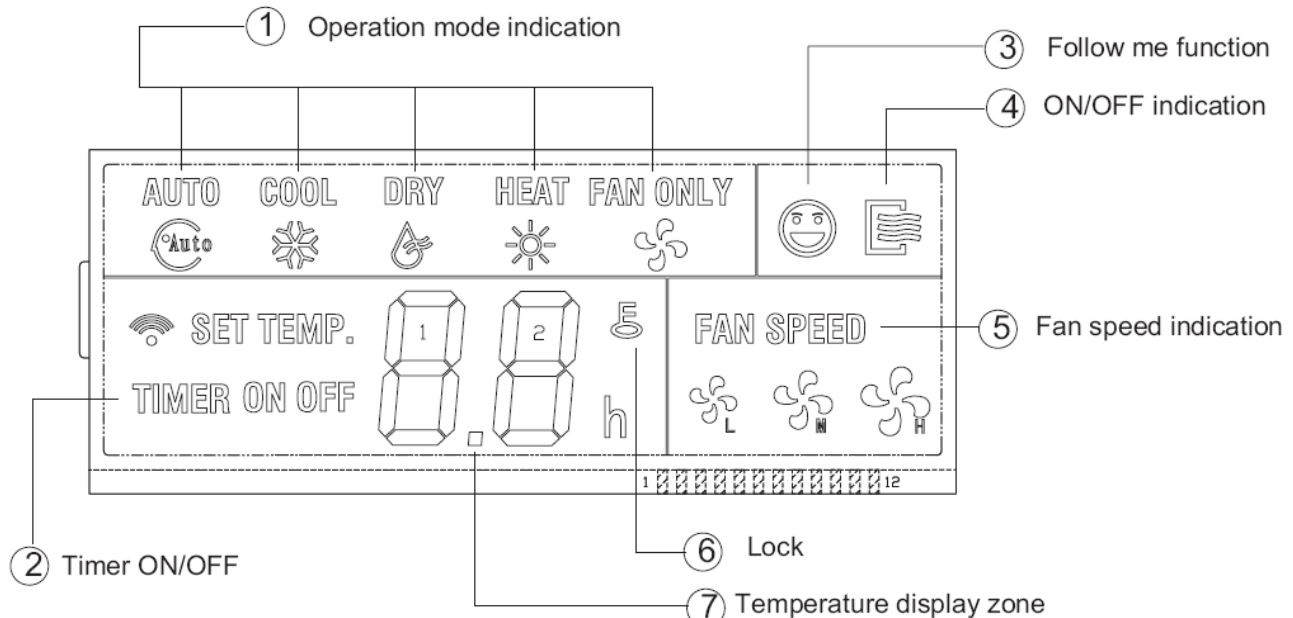
NOTE

Never turn screws too tightly, or else the cover would be dented or the Liquid Crystal breaks. Please leave enough long cable for maintenance of the Wire Controller Board.

2.3 The below is KJR-12B wired remote controller



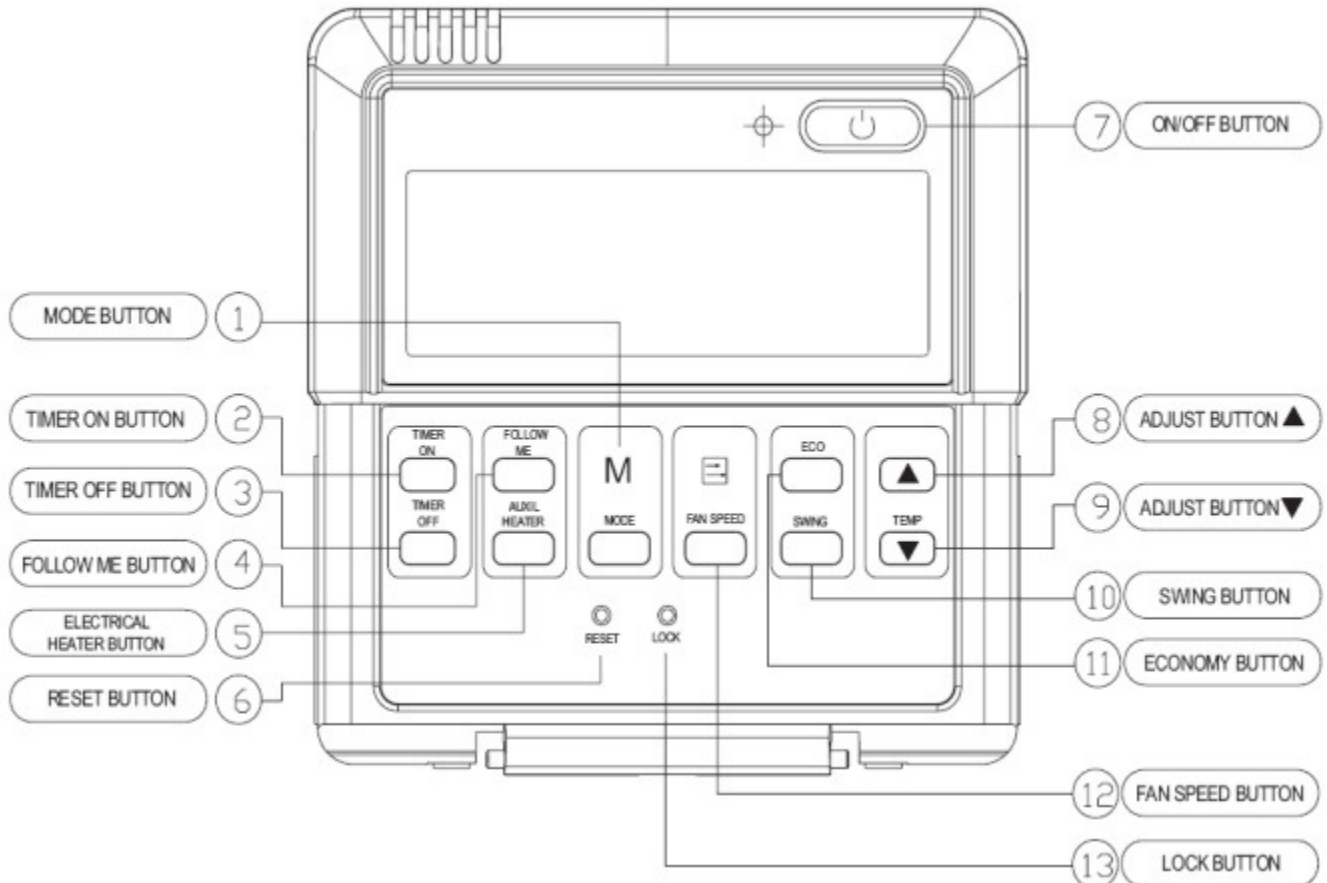
NAME AND FUCTION OF INDICATORS ON THE CONTROLLER



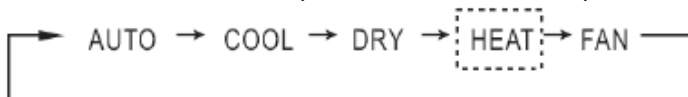
1. Operation mode indication: When press" MODE" button, the following mode can be selected in circle.
Auto→ Cool→ Dry →Heat→ Fan only →Auto
For cooling only model, heat mode is skipped.
2. Timer: When adjust setting on time or only on time is set, the "ON" is lighted. When adjust setting off time or only off time is set, the" OFF" is lighted. If on and off timer are both set, the "ON" and "OFF" are both lighted.
3. Follow me function: There is a temperature sensor inside the wire controller, after setting temperature, it will compare the two temperatures, and the space of wire controller will be the same as setting temperature. It is available under cooling, heating, auto mode.
4. ON/OFF indication: When it is on, the icon display, otherwise it is extinguished.

5. Fan speed indication: There are four fan modes: low, middle, high, auto. For some models, no middle fan then the middle fan is seen as high speed.
6. Lock: When the "LOCK" button is pressed, the icon appears and other buttons is unable, press again, the icon disappears.
7. Temperature display zone: Generally it displays setting temperature; it can be adjusted by press temperature button▲and▼.But in fan mode, no display here.

NAME AND OPERATION OF THE BUTTON ON THE WIRE CONTROLLER



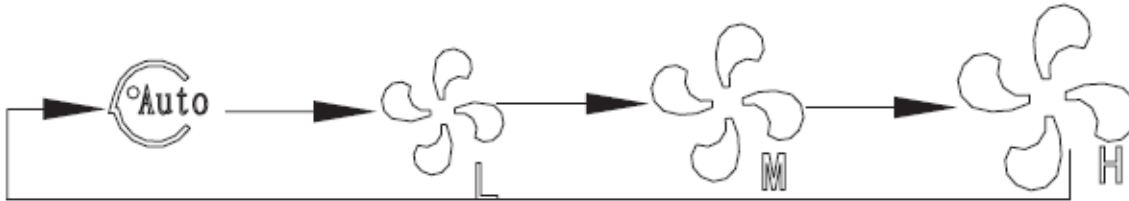
1. Mode button: When press this button, the operation mode change as the following sequence:



Remark: For the cooling only model, the heating mode is skipped.

2. Timer on button: Press this button, timer on function is active. Then every press, the time increase 0.5h, after 10h, 1h incensement after each press. If cancel this Function, just set it to "0.0"
3. Timer off button: Press this button, timer off function is active. Then every press, the time increase 0.5h, after 10h, 1h increasement after each press. If cancel this function, just set it to "0.0" .
4. Follow me button: When under cool, heat and auto mode, press this button, follow me function is active. Press again, this function is ineffective.
5. Electrical heater button: If press this button in heat mode, electrical heater function become ineffective.
6. Reset button (hidden): Use a 1mm stick to press in the little hole , then the current setting is canceled . The wire controllers enter into original state.
7. ON/OFF button: When in off state, press this button, the indicator is on, the wire controller enter into on state, and send setting information to in door PCB. When in on state, press this button, the indicator is off, and send instruction. If timer on or timer off has been set, it cancel this setting then send instruction to stop the machine.
8. Adjust button: Set indoor temperature up. If press and hold on, it will increase at 1degree per 0.5 second.
9. Adjust button: Set indoor temperature down. if press and hold on, it will decrease at 1degree per 0.5 Second.
10. Swing button: First press, start swing function; second press, stop swing. (Match to some model with swing function).

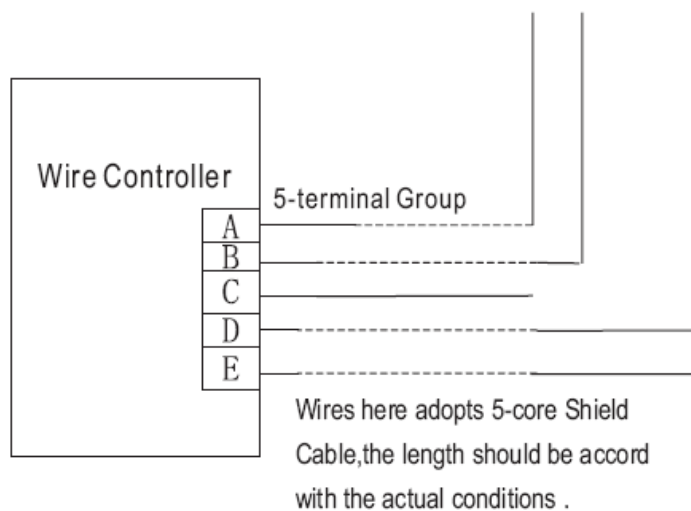
11. Economy operation button: press this button, the indoor unit operates in economy mode, press again, exit this mode (it may be ineffective for some models)
12. Fan speed button: press this button consecutively; the fan speed will circle as follow:



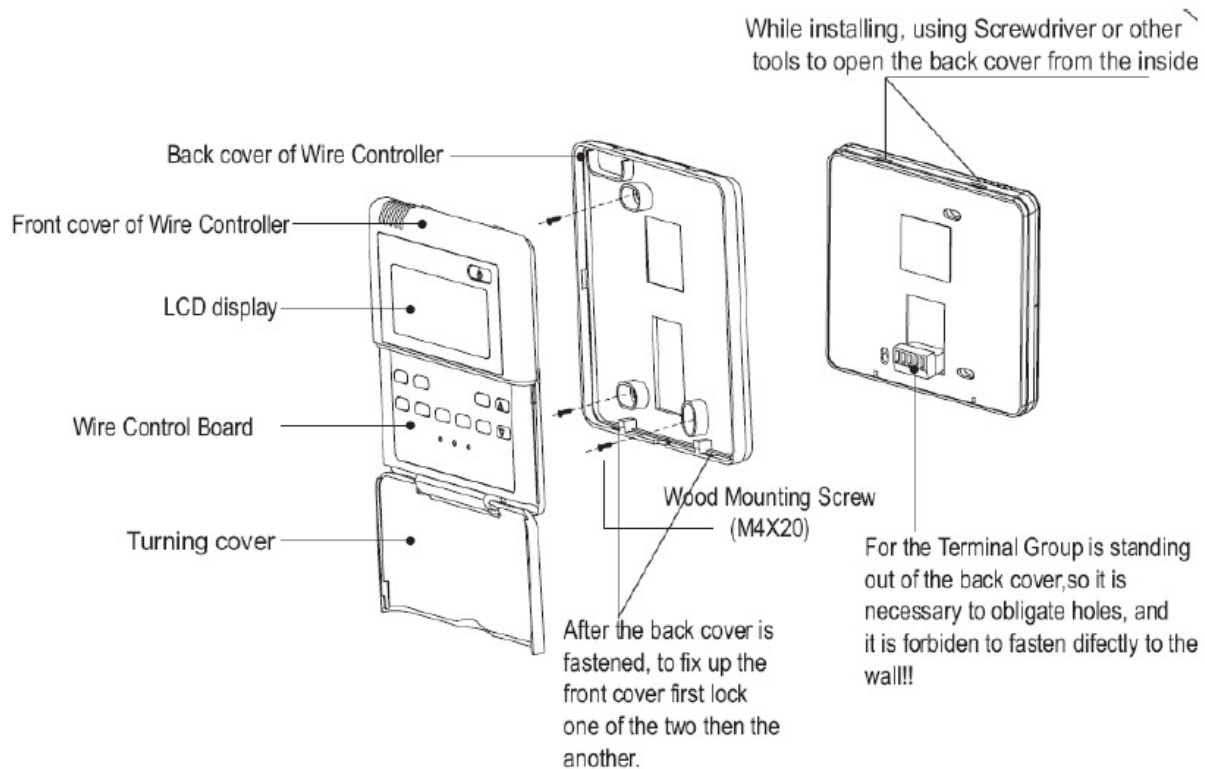
13. Lock button (hidden): When you push the LOCK button, all current settings are locked in and the wire controller does not accept any operation except that of the LOCK button. Use the lock mode when you want to prevent setting from being changed accidentally or play fully. Push the LOCK button again when you want to cancel the LOCK mode.

Installation

Wiring technique and principle:



Instruction for installing When it is necessary to use this controller, it needs to add a small 5-terminal Group and fasten a infrared emitter near to the receiver in the switch board. Connecting the anode and cathode to A 、 B of the Terminal Group, also connect +5V 、 GND、 RUN 、 of the switch board separately to the C、 D、 E of the 5-terminal Group.



NOTE

- The connecting wire should be a little longer as to take away the switch board easily for maintenance.
- The connecting wire should be a little longer as to take away the controller easily for maintenance.

2.4 The below is MD-CCM01 indoor CCM



Part 6

Control Function

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1. Performance Index

No.	Item	Index
1	Applicable Voltage Range	175-253V~, 1ph, 342-418V~, 3ph
2	A/C Frequency	50Hz
3	PCB Working environment temperature	-7℃~ +43℃

2. Main Parts Introduction

2.1 Indoor Fan

High speed, Medium speed and low speed.
Breeze speed for anti-cold air.

2.2 Outdoor Fan

High speed and low speed. For 36KBtu/h (single phase) & 48KBtu/h & 60KBtu/h unit there're two fans, separately controlled by relay.

2.3 Buzzer

- 2.3.1 It will buzz when its driving port in the main chip outputs high level.
- 2.3.2 it will buzz twice when the system is powered on.
- 2.3.2 It will buzz once when the main frame receives remote start-up signal, lasting 0.3sec
- 2.3.3 It will buzz once for 1 second when receiving turn-off signal.
- 2.3.4 It will buzz for 0.5 second once receiving other signal.

2.4 Indicator

- 2.4.1 There are 4 indicators: operating indicator, timer indicator, alarm indicator, defrosting indicator or pre-heating indicator.
- 2.4.2 LED indicates errors when protection is in effective.

2.5 Four-way Valve

It is controlled by relays. Normal working current is less than 1 amp.

2.6 Crank Heater

It starts when $T_4 < 3^{\circ}\text{C}$ and the compressor shut down for more than 3 hours. Also it starts when $T_4 < 3^{\circ}\text{C}$ and reset the plug.
It will stop when $T_4 > 3^{\circ}\text{C}$ or compressor is on.

3. Operation Modes and Functions

3.1 Forced cooling

3.1.1 The forced cooling mode is controlled through “forced cooling” button on the outdoor PCB. The sequence is shown as below when “forced cooling” button is pressed each time



3.1.2 Forced Cooling mode

3.1.2.1 Under this mode, no remote control signal will be received.

3.1.2.2 The compressor is started up unconditionally and the rotating speed of indoor and outdoor fans is set to be in high and forced cooling operation.

3.1.2.3 Under this mode, the buzzer will buzz twice with each lasting 0.5 second at 0.5 interval. During the first 30 minutes of unconditional forced cooling operation, the operation indicator will blink at 0.5Hz. In the process of switchover to manual action mode, the buzzer buzzes for 0.5 second and the indicator is illuminated.

3.1.2.4 Under this mode, the corresponding protections are in effective (3- minute delayed start-up, over current, outdoor protection and evaporator low temperature protection.). Corresponding protection will act once any protection is in active.

Push “Forced cooling” button once to end this mode and enter the remote control pending status. The buzzer will buzz for 1 second and the indicator turn off.

3.1.3 Push “Forced cooling” button to end this mode and switch over to REMOTE CONTROL mode.

3.2 Heating Mode

3.2.1 Four-way valve opens at once, while defrosting process closes.

3.2.2 Indoor Fan Action

3.2.2.1 Anytime remote switchover for fan speeds among high/medium/low/auto, (anti-cold air function takes priority).

3.2.2.2 Anti-cold air:

Switchover between fan speed and fine tune can be set according to temperature of evaporator pipe .

	Condition T= Indoor exchanger temp.	Indoor fan speed
Indoor exchanger temp. up	$T < 28^{\circ}\text{C}$	Off
	$28^{\circ}\text{C} < T < 32^{\circ}\text{C}$	Breeze
	$T > 32^{\circ}\text{C}$	Setting fan speed
Indoor exchanger temp. down	$T > 30^{\circ}\text{C}$	Setting fan speed
	$15^{\circ}\text{C} < T < 30^{\circ}\text{C}$	Breeze
	$T < 15^{\circ}\text{C}$	Off

During anti-cold air period, if indoor fan is shut down, then pre-heating/defrosting lamp is on. Once indoor fan starts, pre-heating/defrosting lamp will be off.

3.2.3 Auto fan of indoor fan under heating mode.

Condition: (T =Indoor Temp.-Setting Temp.)

If current mode is low speed, in case of $T < 2^{\circ}\text{C}$, it changes to medium speed

If current mode is medium speed, in case of $T < 1^{\circ}\text{C}$, it changes to high speed

If current mode is high speed, in case of $> 2^{\circ}\text{C}$, it changes to medium speed

If current mode is medium speed, in case of $> 3^{\circ}\text{C}$, it changes to low speed.

3.3 Defrosting Mode (only available for heating mode)

3.3.1.1 Defrosting Conditions

3.3.1.1.1 Low temperature defrosting condition:

Accumulated operating time when temperature of outdoor heat exchanger coil T3 is below -2°C (For 36KBtu/h & 48KBtu/h with 1 phase, it's 0°C) reaches up to over 40 minutes.

3.3.1.1.2 High temperature defrosting condition:

Under high temperature protection of evaporator, the time when outdoor fan is shut down but compressor is not has been accumulated for up to 90 minutes. It is considered that defrosting is performed when either 3.3.1.1 or 3.3.1.2 is met.

3.3.1.2 Defrosting Action

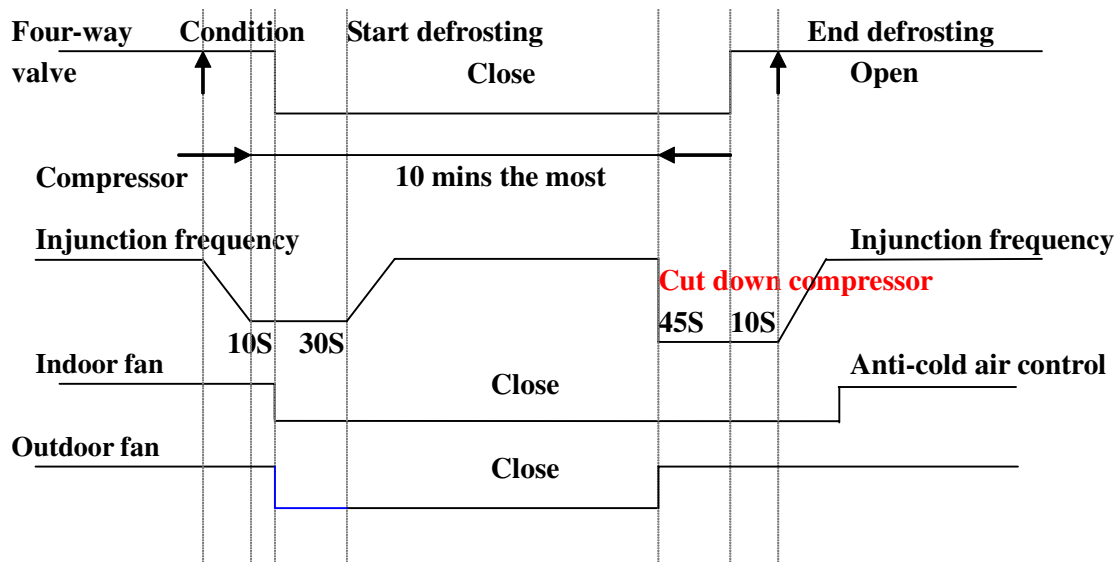
Four-way valve and outdoor fan are shut down. Indoor fan operates according to anti-cold air function. Compressor keeps on continuously. Defrosting lamp lights.

3.3.1.3 Ending of Defrosting Condition

It is considered that defrosting condition is ended when any of the conditions is met:

3.3.1.3.1 Time of defrosting reaches 10 minutes.

3.3.1.3.2 Temperature of outdoor coil T3 is up to 15°C.



3.3.1.4 Ending Action of Defrost

3.3.1.4.1 Outdoor fan and four-way valve are open.

3.3.1.4.2 Compressor keeps on continuously.

3.3.1.4.3 Indoor fan acts according to anti-cold air function.

3.3.1.4.4 Defrosting/pre-heating lamp remains on until indoor fan starts up.

3.4 Cooling Mode

3.4.1 Four-way valve is closed. If four-way valve is open before the machine enters cooling mode, then four-way valve will be closed at the first time the compressor starts under the cooling mode.

3.4.2 Action of Indoor Fan

3.4.2.1 HIGH/ MEDIUM /LOW/AUTO fan can be switched over for your comfort.

3.4.2.2 Auto fan under cooling mode.

Condition: (T =Indoor Temp.-Setting Temp.)

If current mode is high speed, in case of $T \leq 3^{\circ}\text{C}$, it changes to medium speed

If current mode is medium speed, in case of $T \leq 1^{\circ}\text{C}$, it changes to low speed

If current mode is low speed, in case of $>3^{\circ}\text{C}$, it changes to medium speed

If current mode is medium speed, in case of $>4^{\circ}\text{C}$, it changes to high speed.

3.5 Dehumidifying Mode

3.5.1 Dehumidifying mode is the cooling operation, under which the indoor fan is **low speed**.

3.5.2 Protective condition is priority.

3.6 Auto Mode

- 3.6.1 Under auto mode, the indoor fan is set to be auto (refer to auto fan under cooling, heating).under Auto mode the setting temperature is rang from 17~30 °C.
- 3.6.2 When entering auto mode, the heating, fan only or cooling operation will be automatically chosen according to the room temperature T_a and the set temperature T_s .
 - 3.6.2.1 When $T_a < T_s - 1\text{ }^{\circ}\text{C}$, it performs the heating operation with a set temperature of $T_s - 1\text{ }^{\circ}\text{C}$ (refer to the heating mode). And the fan runs according to the corresponding mode.
 - 3.6.2.2 When $T_s + 2\text{ }^{\circ}\text{C} \geq T_a \geq T_s - 1\text{ }^{\circ}\text{C}$, control according to cooling auto fan with a set temperature of 23°C.
 - 3.6.2.3 When $T_a > T_s + 2\text{ }^{\circ}\text{C}$, it performs the cooling operation with a set temperature of T_s (refer to the cooling mode).
- 3.6.3 After one mode is chosen, if the condition $T_a > T_s + 1\text{ }^{\circ}\text{C}$ or $T_a < T_s - 1\text{ }^{\circ}\text{C}$ lasts for 15 minutes, meanwhile the compressor doesn't start up within consecutive 15 minutes, the operation mode will be re-chosen according to the T_a and T_s .
- 3.6.4 Protective condition is activated.

3.7. Fan Only Mode

- 3.7.1 Under this mode, four-way valve, compressor and outdoor fan are shut down.
- 3.7.2 High/Low/ Medium/Auto fan can be switched over through manual control. Auto fan will be controlled in line with cooling auto fan with temperature set to be 23°C.
- 3.7.3 After entering fan mode, the operating indicator is on. If the model is cooling only mode, fan indicator is on at the same time.

4. Other Functions

4.1 LED Display

Operation lamp, timer lamp, defrosting/pre-heating lamp, and water level alarm lamp.

4.1.1 Operation Lamp

When the operation is recovering, it will blink at 1 Hz.

After the unit is on, the lamp will keep on.

After the unit is off, the lamp will be off.

When the unit is switched over from manual cooling to remote control, the lamp will be off.

4.1.2 Timer Lamp

During timer operation, it will be on.

4.1.3 Defrosting/Pre-Heating Lamp

When heat pump model performs defrosting or anti-cold air, it will be on.

4.1.4 Water Level Alarm Lamp

When water level is above the alarm level, it will blink at 5Hz.

4.2 Timer

Refer to remote controller manual for detail operation.

Note: The timer is valid for one operation of the A/C.

4.3 Louver Action

For cassette and ceiling type, press the “swing” button (horizontal and vertical), the louver will change a certain degree.

4.4 Drain pump

Adopt the water-level switch to control the action of drain pump.

Main action under different condition :(every 5 seconds the system will check the water level one time)

1. When the A/C operates with cooling (including auto cooling), dehumidifying, and forced cooling mode, the pump will start running immediately and continuously, till stop cooling.
2. When standing-by, heating and fan only (including auto heating and auto fan), once the water level increase and up to the control point, LED will alarm and compressor will be forced stop running, at the same time the drain pump open and continue checking the water level. If the water level fall down and LED disarmed (drain pump delay close 1 minute), the compressor restart (3 minutes delay protection prior) and operate with the last mode. Otherwise the entire system stop operating (including the pump) and LED remain alarming, this condition will not recover except power off.

5. Main protective functions:

5.1. 1 3-minute delay for the compressor start-up.

When first time powering on or after the stop of compressor, 3-minute delay will be needed to start the compressor.

When switch over between cooling/heating mode, the compressor stops automatically.

5.1.2 Evaporator protection against high temperature (heating mode)

Only available for heating mode, including auto heating mode.

※ Note: During protection, the indoor fan continues operating at a setting speed, while the anti-cold air function of heating and the compressor will be 3 minute delayed to shut down for protection.

5.1.3 Evaporator Protection against low temperature (cooling mode)

5.1.3.1 When the evaporator pipe temperature $\leq 2^{\circ}\text{C}$ and this lasts for 3 minutes, the compressor and outdoor fan will be shut off.

5.1.3.2 When the evaporator pipe temperature $\geq 7^{\circ}\text{C}$, it recovers.

5.1.3.3 The restart of the compressor shall execute the delay protection.

5.1.4 Anti-cold air protection

Only available in heating mode, including heating mode and heating operation under auto mode.

When the indoor temp. raises, if it is lower than 28°C , the indoor fan stops; if it is between $28-32^{\circ}\text{C}$, the indoor fan will run with low speed; and if it is higher than 32°C , the indoor fan will run with the setting speed. When the indoor temp. drops, if it is lower than 15°C , the indoor fan stops; if it is between $15-30^{\circ}\text{C}$, the indoor fan will run with low speed; and if it is higher than 30°C , the indoor fan will run with the setting speed.

5.1.5 Condenser high temperature protection

5.1.6.1 Only available to cooling (incl. cooling mode, cooling operation under auto mode) and dehumidifying mode.

5.1.6.2 Delay protection should be performed when the compressor restarts.

5.1.6 Outdoor protection

When outdoor protection happen, system will stop running and LED display corresponding contents.

5.1.7 Power supply electricity sequence protection

1. For 1 phase unit it owns a starting circuit. 1 second before startup, capacitor is switched on and then broken.

2. For 3 phase unit it must have the phase sequence and lacking of phase checking and protecting function. Etc.

6. System precision

- 1) Temperature sampling precision: $\pm 1^{\circ}\text{C}$
- 2) Current sampling precision: ± 1.5 amps
- 3) Timing sampling precision: ± 1 min/hour
- 4) Swing angle sampling precision: 0.7 degree

7. Point Check

There's a point-check button in the outdoor PCB, it cooperates with LED in the outdoor PCB to show the status of the outdoor unit. Each time the button is pressed, the data shown in the LED is different. The details are shown in the following:

- 0, Normal display
- 1, Running mode: 0---Stand by; 2---Cooling; 3---Heating; 4---Forced cooling;
- 2, Running fan speed: 0---Turn off; 1---Low speed; 2---High speed;
- 3, Capacity demand
- 4, T3- Outdoor pipe temp. (Actual value)
- 5, TP-Discharge temp. (Actual value, if it is over 100, only display hundreds digit and tens digit)
- 6, T4-Ambient temp. (Actual value)
- 7, Current of compressor
- 8, Outdoor PMV opening degree
- 9, The last error or protection code (Display 00 if no error)
- 10, AD value of volt

8. Appendix

Appendix 1

Temp	Resistance (KΩ)			Resist.tol %		Temp.tol°C	
(Φ)	Rmax	R (t) Normal	Rmin	MAX(+)	MIN(-)	MAX(+)	MIN(-)
-20	116.539	106.732	96.920	9.19	9.19	1.59	1.59
-19	110.231	100.552	91.451	9.63	9.05	1.57	1.57
-18	103.743	94.769	86.328	9.47	8.91	1.56	1.55
-17	97.673	89.353	81.525	9.31	8.76	1.54	1.54
-16	91.990	84.278	77.017	9.15	8.62	1.53	1.52
-15	86.669	79.521	72.788	8.99	8.47	1.51	1.50
-14	81.684	75.059	68.815	8.83	8.32	1.49	1.48
-13	77.013	70.873	65.083	8.66	8.17	1.47	1.47
-12	72.632	66.943	61.574	8.50	8.02	1.45	1.45
-11	68.523	63.252	58.274	8.33	7.87	1.44	1.43
-10	64.668	59.784	55.169	8.17	7.72	1.42	1.41
-9	61.048	56.524	52.246	8.00	7.57	1.40	1.39
-8	57.649	53.458	49.492	7.84	7.42	1.38	1.37
-7	54.456	50.575	46.899	7.67	7.27	1.35	1.35
-6	51.456	47.862	44.455	7.51	7.12	1.33	1.32
-5	48.636	45.308	42.150	7.35	6.97	1.31	1.30
-4	45.984	42.903	39.977	7.18	6.82	1.29	1.28
-3	43.490	40.638	37.927	7.02	6.67	1.27	1.26
-2	41.144	38.504	35.992	6.86	6.52	1.25	1.24
-1	38.935	36.492	34.165	6.70	6.38	1.23	1.21
0	36.857	34.596	32.440	6.53	6.23	1.21	1.19
1	34.898	32.807	30.810	6.38	6.09	1.18	1.17
2	33.055	31.120	29.271	6.22	5.94	1.16	1.15
3	31.317	29.528	27.815	6.06	5.80	1.14	1.12
4	29.681	28.026	26.440	5.90	5.66	1.12	1.10
5	28.138	26.608	25.140	5.75	5.52	1.10	1.08
6	26.682	25.268	23.909	5.60	5.38	1.07	1.06
7	25.310	24.003	22.745	5.45	5.24	1.05	1.03
8	24.016	22.808	21.644	5.30	5.10	1.03	1.01
9	22.794	21.678	20.601	5.15	4.97	1.01	0.99
10	21.641	20.610	19.614	5.00	4.83	0.99	0.97
11	20.553	19.601	18.680	4.86	4.70	0.96	0.94
12	19.525	18.646	17.794	4.71	4.57	0.94	0.92
13	18.554	17.743	16.955	4.57	4.44	0.92	0.90
14	17.636	16.888	16.160	4.43	4.31	0.90	0.88
15	16.769	16.079	15.406	4.29	4.19	0.88	0.85
16	15.949	15.313	14.691	4.15	4.06	0.86	0.83
17	15.174	14.588	14.014	4.02	3.94	0.84	0.81
18	14.442	13.902	13.372	3.89	3.81	0.81	0.79
19	13.748	13.251	12.762	3.75	3.69	0.79	0.76
20	13.093	12.635	12.183	3.62	3.57	0.77	0.74
21	12.471	12.050	11.634	3.50	3.46	0.75	0.72
22	11.883	11.496	11.112	3.37	3.34	0.73	0.70
23	11.327	10.971	10.617	3.25	3.23	0.71	0.68
24	10.800	10.473	10.147	3.12	3.11	0.69	0.66
25	10.300	10.000	9.700	3.00	3.00	0.67	0.63

Temp	Resistance (KΩ)			Resist.tol %		Temp.tol℃	
(Φ)	Rmax	R (t) Normal	Rmin	MAX(+)	MIN(-)	MAX(+)	MIN(-)
26	9.848	9.551	9.255	3.11	3.10	0.69	0.66
27	9.418	9.125	8.834	3.21	3.19	0.72	0.69
28	9.010	8.721	8.434	3.31	3.29	0.75	0.71
29	8.621	8.337	8.055	3.41	3.38	0.77	0.74
30	8.252	7.972	7.695	3.51	3.47	0.80	0.77
31	7.900	7.625	7.353	3.61	3.57	0.83	0.79
32	7.566	7.296	7.029	3.70	3.66	0.85	0.82
33	7.247	6.982	6.721	3.80	3.74	0.88	0.84
34	6.944	6.684	6.428	3.89	3.83	0.91	0.87
35	6.656	6.401	6.150	3.98	3.92	0.93	0.90
36	6.381	6.131	5.886	4.08	4.00	0.96	0.93
37	6.119	5.874	5.634	4.17	4.09	0.98	0.95
38	5.870	5.630	5.395	4.26	4.17	1.01	0.98
39	5.631	5.397	5.167	4.34	4.26	1.03	1.01
40	5.404	5.175	4.951	4.43	4.34	1.06	1.03
41	5.188	4.964	4.745	4.52	4.42	1.09	1.06
42	4.982	4.763	4.549	4.60	4.50	1.12	1.09
43	4.785	4.571	4.362	4.69	4.58	1.14	1.12
44	4.596	4.387	4.183	4.77	4.66	1.17	1.14
45	4.417	4.213	4.014	4.85	4.74	1.19	1.17
46	4.246	4.046	3.851	4.93	4.81	1.22	1.20
47	4.082	3.887	3.697	5.02	4.89	1.25	1.23
48	3.925	3.735	3.550	5.10	4.97	1.28	1.25
49	3.776	3.590	3.409	5.18	5.04	1.30	1.28
50	3.632	3.451	3.274	5.25	5.12	1.33	1.30
51	3.495	3.318	3.146	5.33	5.19	1.35	1.33
52	3.363	3.191	3.023	5.41	5.26	1.41	1.36
53	3.237	3.069	2.905	5.49	5.34	1.43	1.38
54	3.116	2.952	2.793	5.56	5.41	1.46	1.41
55	3.001	2.841	2.685	5.64	5.48	1.48	1.44
56	2.890	2.734	2.582	5.71	5.55	1.51	1.46
57	2.784	2.632	2.484	5.79	5.62	1.54	1.49
58	2.682	2.534	2.390	5.86	5.69	1.56	1.52
59	2.585	2.440	2.299	5.93	5.76	1.59	1.54
60	2.491	2.350	2.213	6.01	5.83	1.62	1.57
61	2.401	2.264	2.130	6.08	5.90	1.64	1.60
62	2.315	2.181	2.051	6.15	5.96	1.67	1.62
63	2.233	2.102	1.975	6.22	6.03	1.70	1.65
64	2.154	2.026	1.903	6.29	6.10	1.72	1.68
65	2.077	1.953	1.833	6.36	6.16	1.75	1.70
66	2.004	1.883	1.766	6.42	6.23	1.77	1.73
67	1.934	1.816	1.702	6.49	6.29	1.80	1.76
68	1.867	1.752	1.641	6.56	6.35	1.83	1.78
69	1.802	1.690	1.582	6.62	6.41	1.85	1.81
70	1.740	1.631	1.525	6.69	6.48	1.88	1.84
71	1.680	1.574	1.471	6.75	6.54	1.91	1.86
72	1.622	1.519	1.419	6.82	6.60	1.93	1.89
73	1.567	1.466	1.369	6.88	6.66	1.96	1.92

Temp	Resistance (KΩ)			Resist.tol %		Temp.tol℃	
(Φ)	Rmax	R (t) Normal	Rmin	MAX(+)	MIN(-)	MAX(+)	MIN(-)
74	1.514	1.416	1.321	6.94	6.71	1.98	1.94
75	1.463	1.367	1.275	7.00	6.77	2.01	1.97
76	1.414	1.321	1.230	7.06	6.83	2.04	2.00
77	1.367	1.276	1.188	7.12	6.88	2.06	2.02
78	1.321	1.233	1.147	7.17	6.94	2.09	2.05
79	1.277	1.191	1.108	7.23	6.99	2.12	2.08
80	1.235	1.151	1.070	7.28	7.04	2.14	2.11
81	1.195	1.113	1.034	7.33	7.09	2.17	2.13
82	1.156	1.076	0.999	7.39	7.14	2.20	2.16
83	1.118	1.041	0.966	7.44	7.18	2.22	2.19
84	1.082	1.007	0.934	7.48	7.23	2.25	2.21
85	1.047	0.974	0.903	7.53	7.27	2.27	2.24
86	1.014	0.942	0.874	7.57	7.31	2.30	2.27
87	0.982	0.912	0.845	7.62	7.35	2.33	2.29
88	0.951	0.883	0.818	7.66	7.39	2.35	2.32
89	0.921	0.855	0.791	7.69	7.43	2.38	2.35
90	0.892	0.828	0.766	7.73	7.46	2.41	2.37
91	0.864	0.802	0.742	7.76	7.49	2.43	2.40
92	0.838	0.777	0.719	7.80	7.52	2.46	2.43
93	0.812	0.753	0.696	7.82	7.54	2.48	2.45
94	0.787	0.730	0.675	7.85	7.57	2.51	2.48
95	0.763	0.708	0.654	7.87	7.59	2.54	2.51
96	0.740	0.686	0.634	7.89	7.61	2.56	2.53
97	0.718	0.666	0.615	7.91	7.62	2.59	2.56
98	0.697	0.646	0.597	7.93	7.63	2.62	2.59
99	0.677	0.627	0.579	7.94	7.64	2.64	2.61
100	0.657	0.609	0.562	7.94	7.65	2.67	2.64
101	0.638	0.591	0.546	7.95	7.65	2.70	2.67
102	0.620	0.574	0.530	7.95	7.65	2.72	2.69
103	0.602	0.558	0.515	7.94	7.64	2.75	2.72
104	0.585	0.542	0.501	7.94	7.63	2.77	2.75
105	0.569	0.527	0.485	7.92	7.92	2.80	2.77

Appendix 2

Unit: Φ ---K				Discharge temp. sensor table			
-20	542.7	20	68.66	60	13.59	100	3.702
-19	511.9	21	65.62	61	13.11	101	3.595
-18	483	22	62.73	62	12.65	102	3.492
-17	455.9	23	59.98	63	12.21	103	3.392
-16	430.5	24	57.37	64	11.79	104	3.296
-15	406.7	25	54.89	65	11.38	105	3.203
-14	384.3	26	52.53	66	10.99	106	3.113
-13	363.3	27	50.28	67	10.61	107	3.025
-12	343.6	28	48.14	68	10.25	108	2.941
-11	325.1	29	46.11	69	9.902	109	2.86
-10	307.7	30	44.17	70	9.569	110	2.781
-9	291.3	31	42.33	71	9.248	111	2.704
-8	275.9	32	40.57	72	8.94	112	2.63
-7	261.4	33	38.89	73	8.643	113	2.559
-6	247.8	34	37.3	74	8.358	114	2.489
-5	234.9	35	35.78	75	8.084	115	2.422
-4	222.8	36	34.32	76	7.82	116	2.357
-3	211.4	37	32.94	77	7.566	117	2.294
-2	200.7	38	31.62	78	7.321	118	2.233
-1	190.5	39	30.36	79	7.086	119	2.174
0	180.9	40	29.15	80	6.859	120	2.117
1	171.9	41	28	81	6.641	121	2.061
2	163.3	42	26.9	82	6.43	122	2.007
3	155.2	43	25.86	83	6.228	123	1.955
4	147.6	44	24.85	84	6.033	124	1.905
5	140.4	45	23.89	85	5.844	125	1.856
6	133.5	46	22.89	86	5.663	126	1.808
7	127.1	47	22.1	87	5.488	127	1.762
8	121	48	21.26	88	5.32	128	1.717
9	115.2	49	20.46	89	5.157	129	1.674
10	109.8	50	19.69	90	5	130	1.632
11	104.6	51	18.96	91	4.849		
12	99.69	52	18.26	92	4.703		
13	95.05	53	17.58	93	4.562		
14	90.66	54	16.94	94	4.426		
15	86.49	55	16.32	95	4.294	B(25/50)=3950K	
16	82.54	56	15.73	96	4.167		
17	78.79	57	15.16	97	4.045	R(90℃)=5K Ω ±3%	
18	75.24	58	14.62	98	3.927		
19	71.86	59	14.09	99	3.812		