



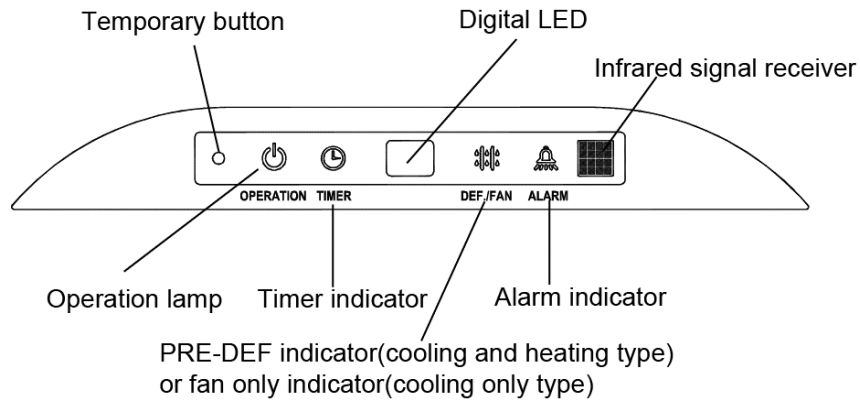
LIGHT COMMERCIAL

Troubleshooting

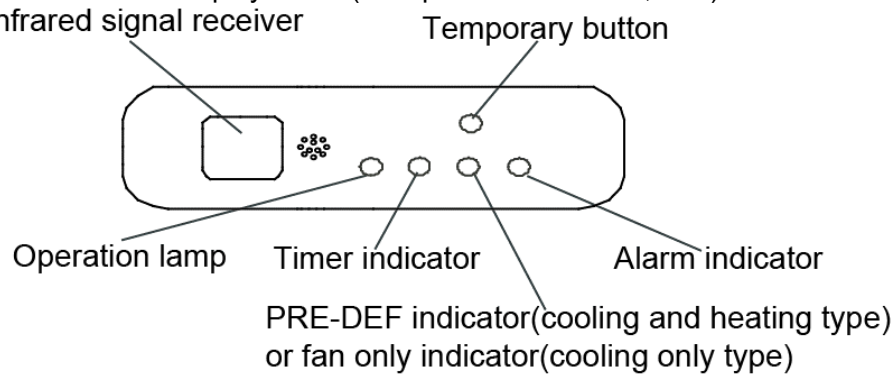
2. Troubleshooting

2.1 Display board

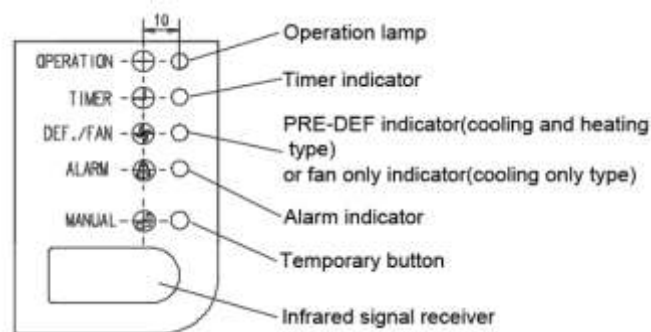
2.1.1 Icon explanation on indoor display board (Super slim cassette 24K).



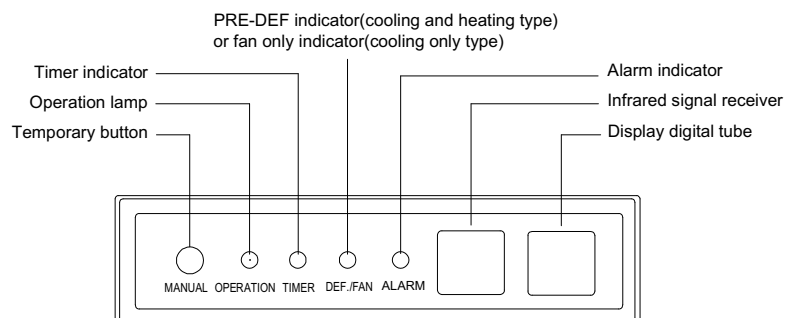
2.1.2 Icon explanation on indoor display board (Compact cassette 12K, 18K).



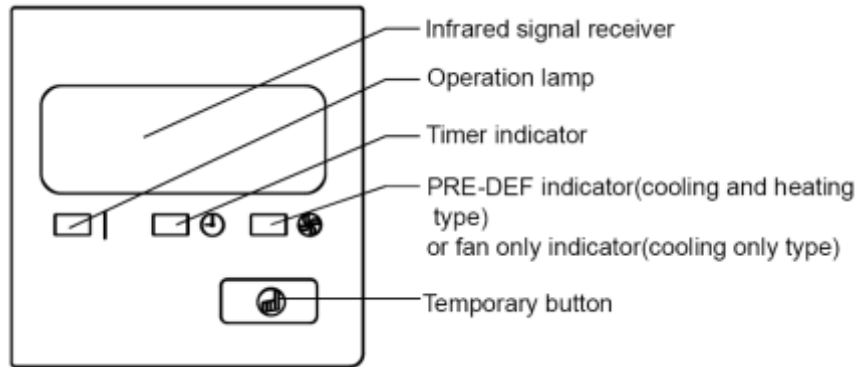
2.1.3 Icon explanation on indoor display board (Ceiling & Floor, 12K, 18K)



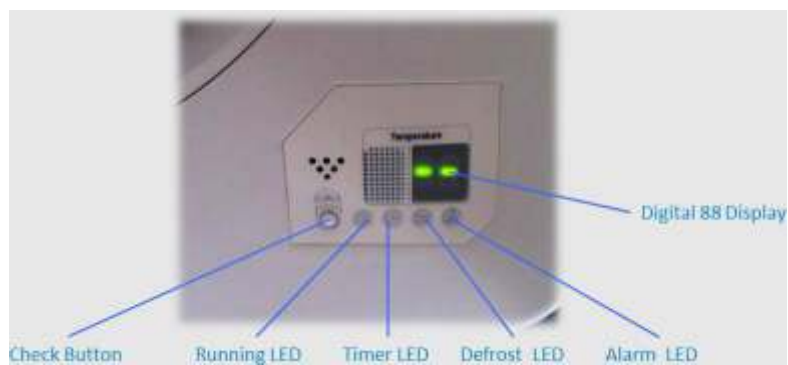
2.1.4 Icon explanation on indoor display board (Duct)



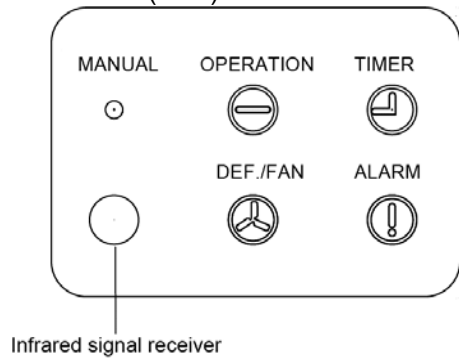
2.1.5 Icon explanation on indoor display board (Console)



2.1.6 Display board of auto-lifting panel of 4 way cassette (24K Cassette)



2.1.7 Display board of Ceiling-floor indoor unit (24K)



2.2 Indoor unit malfunction

For Console(12K)

NO.	Malfunction	lamp	Running lamp	Timer lamp	Defrosting
1	Open or short circuit of T1 temperature sensor		☆	X	X
2	Open or short circuit of T2 temperature sensor		X	X	☆
3	Communication malfunction between indoor and outdoor units.		X	☆	X
4	Outdoor fan speed has been out of control		X	☆	O
5	Indoor EEPROM malfunction		☆	☆	X
6	IPM module protection		☆	X	☆
7	Open or short circuit of T3 or T4 temperature sensor Outdoor unit EEPROM parameter error		☆	☆	☆
8	Over voltage or over low voltage protection		☆	☆	O
9	Top temperature protection of compressor		☆	O	X
10	Inverter compressor drive protection		☆	◎	X
11	Indoor fan Speed has been out of control.		☆	O	☆

O(light) X(off) ☆(flash at 5Hz) ◎(flash at 0.5Hz)

For 12K & 18K units(except console)

NO.	Malfunction	Running lamp	Timer lamp	Defrosting lamp	Alarm lamp	Display(nixie tube)
1	Open or short circuit of T1 temperature sensor	☆	X	X	X	E0
2	Open or short circuit of T2 temperature sensor	X	X	☆	X	E1
3	Communication malfunction between indoor and outdoor units.	X	☆	X	X	E2
4	Full-water malfunction	X	X	X	☆	E3
5	Indoor EEPROM malfunction	☆	☆	X	X	E4
6	IPM module protection	☆	X	X	O	E5
7	Open or short circuit of T3 or T4 temperature sensor or outdoor EEPROM is malfunction	☆	O	X	X	E6
8	Outdoor fan is out of control	☆	O	☆	X	E7
9	Indoor fan speed is out of control	☆	O	O	X	F5
10	Outdoor unit voltage protection	☆	O	X	O	P0
11	Compressor top temperature protection	☆	X	O	X	P1
12	Outdoor unit over-current protection	☆	☆	X	☆	P2
13	Inverter compressor drive error	☆	◎	X	X	P4

O(light) X(off) ☆(flash at 2.5Hz) ◎(flash at 0.5Hz)

For 24K Units

NO.	Malfunction	Defrosting lamp	Alarm lamp	Running lamp	Timer lamp	Display(digital tube)
1	Communication malfunction between indoor and outdoor units.	X	X	X	☆	E1
2	Open or short circuit of T1 temperature sensor	X	X	☆	X	E2

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3	Open or short circuit of T2 temperature sensor	X	X	☆	X	E3
4	Open or short circuit of T2B temperature sensor	X	X	☆	X	E4
5	Indoor EEPROM malfunction	☆	X	X	X	E7
6	Indoor fan speed is out of control	☆	☆	X	X	E8
7	Refrigerant Leakage Detection	☆	☆	O	X	EC
8	Outdoor unit malfunction	X	◎	X	X	Ed
9	Full-water malfunction	X	☆	X	X	EE
10	Communication malfunction between main PCB and up-down panel PCB	☆	☆	☆	X	F0
11	Up-down panel malfunction	☆	☆	X	☆	F1
12	Up-down panel is not closed	☆	☆	X	O	F2
13	Communication malfunction between master unit and slave unit	X	☆	X	☆	F3
14	Other malfunction of master unit or slave unit	X	☆	☆	X	F4
O (on) X(off)☆(flash at 5Hz) ◎(flash at 0.5Hz) F0,F1,F2 is only available for super-slim cassette						

2.3 Outdoor unit malfunction (for 24K)

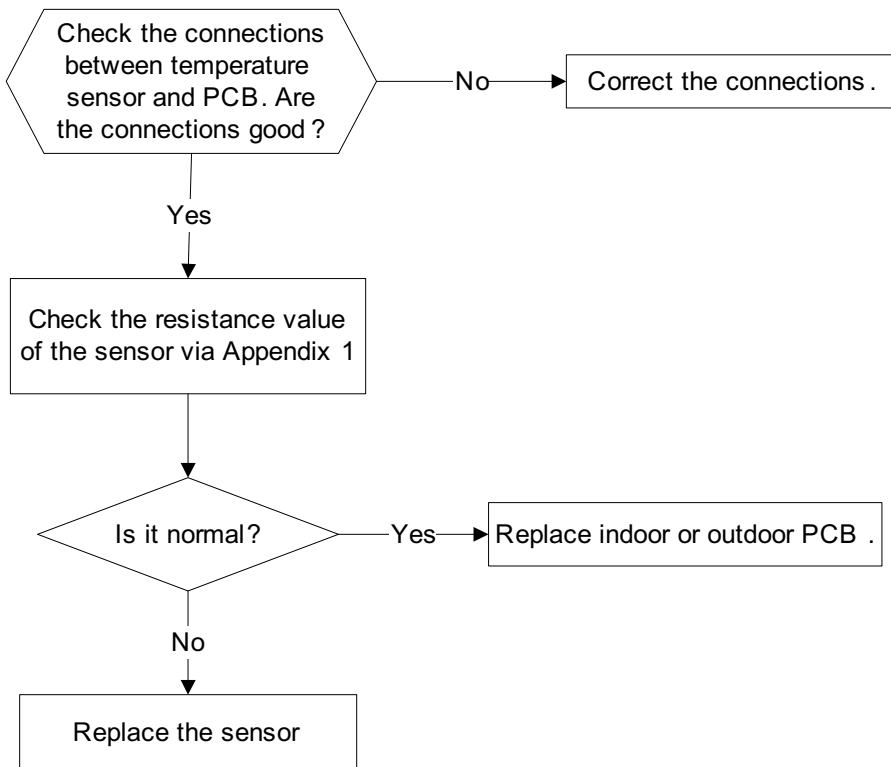
Display	Malfunction or Protection
E0	Outdoor EEPROM malfunction
E2	Indoor / outdoor units communication error
E3	Communication malfunction between IPM board and outdoor main board
E4	Open or short circuit of T3 or T4 temperature sensor
E5	Voltage protection of compressor
E6	PFC module protection (For 36K-48K)
E8	Outdoor fan speed has been out of control
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	IPM module protection
P7	High temperature protection of evaporator

In low ambient cooling mode, the LED displays "LC" or alternative displays between running frequency and "LC"(each displays 0.5s)

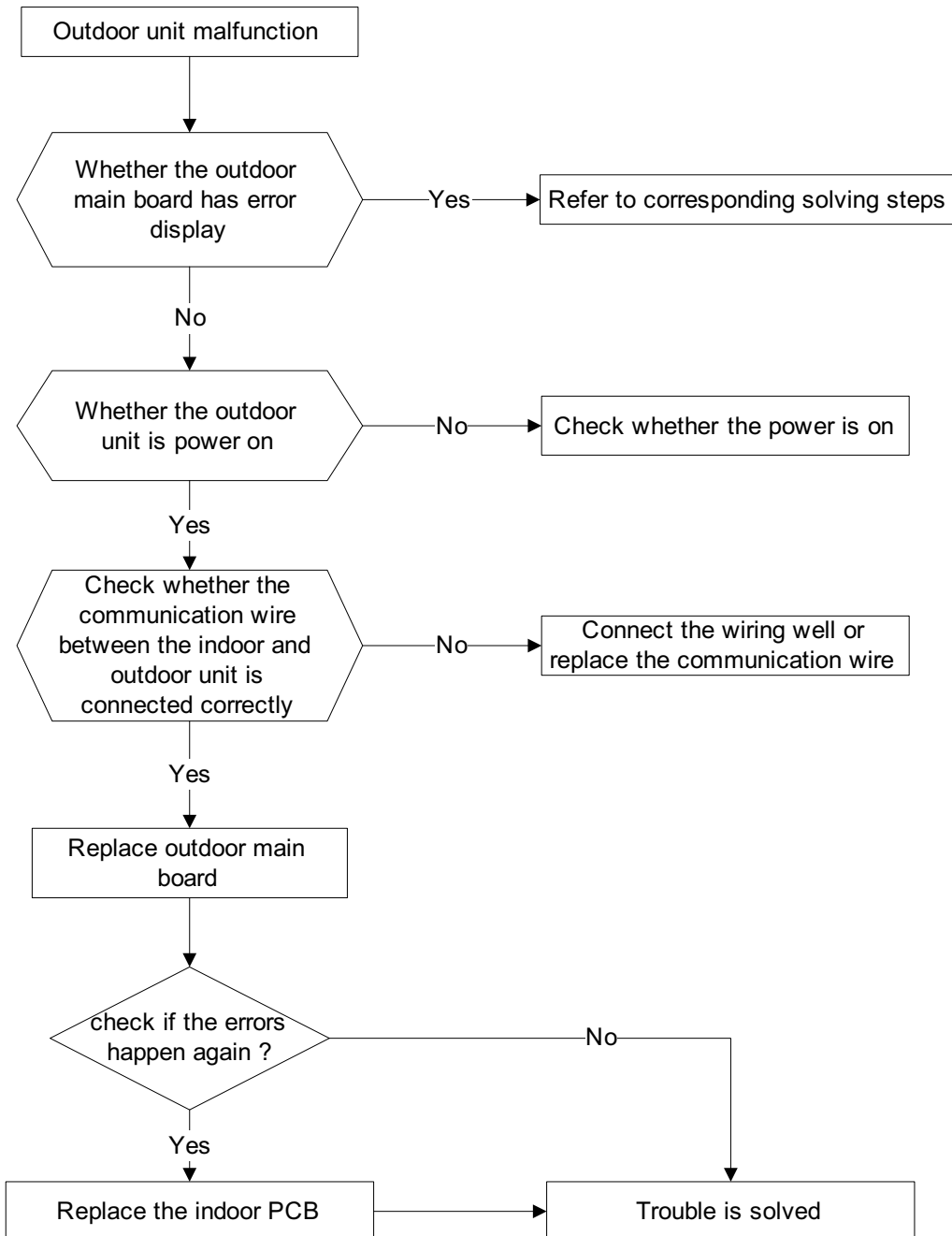
2.4 Solving steps for typical malfunction

2.4.1 For the indoor unit

2.4.1.1 Open or short circuit of temperature sensor

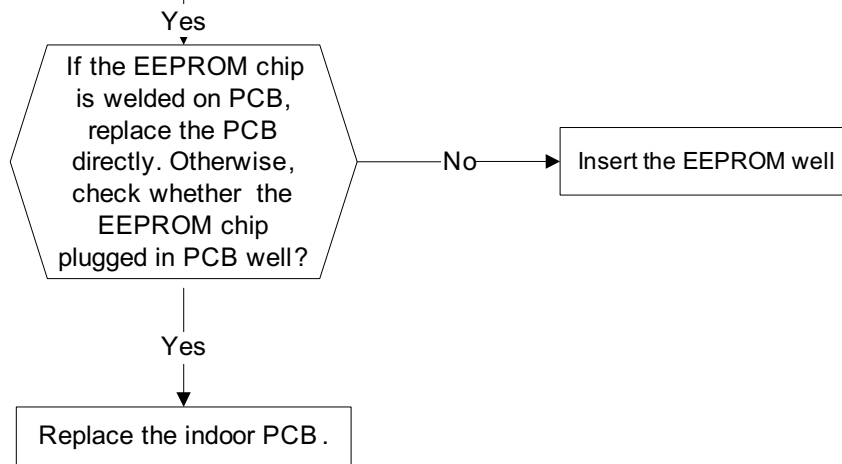


2.4.1.2. Outdoor unit malfunction

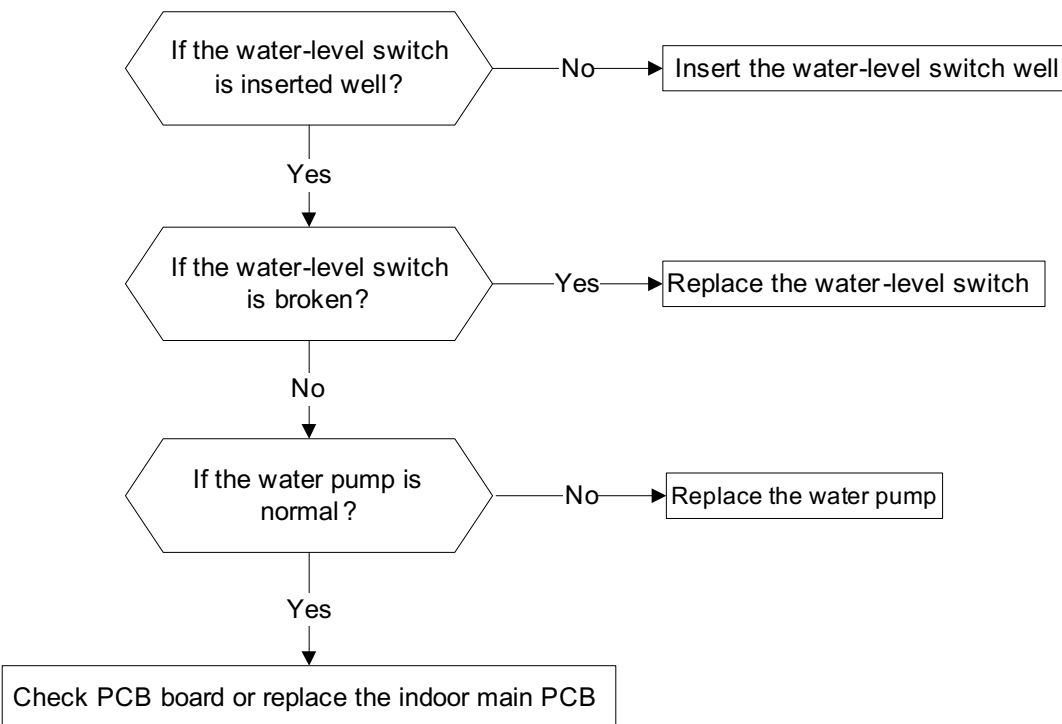


2.4.1.3. Indoor EEPROM malfunction

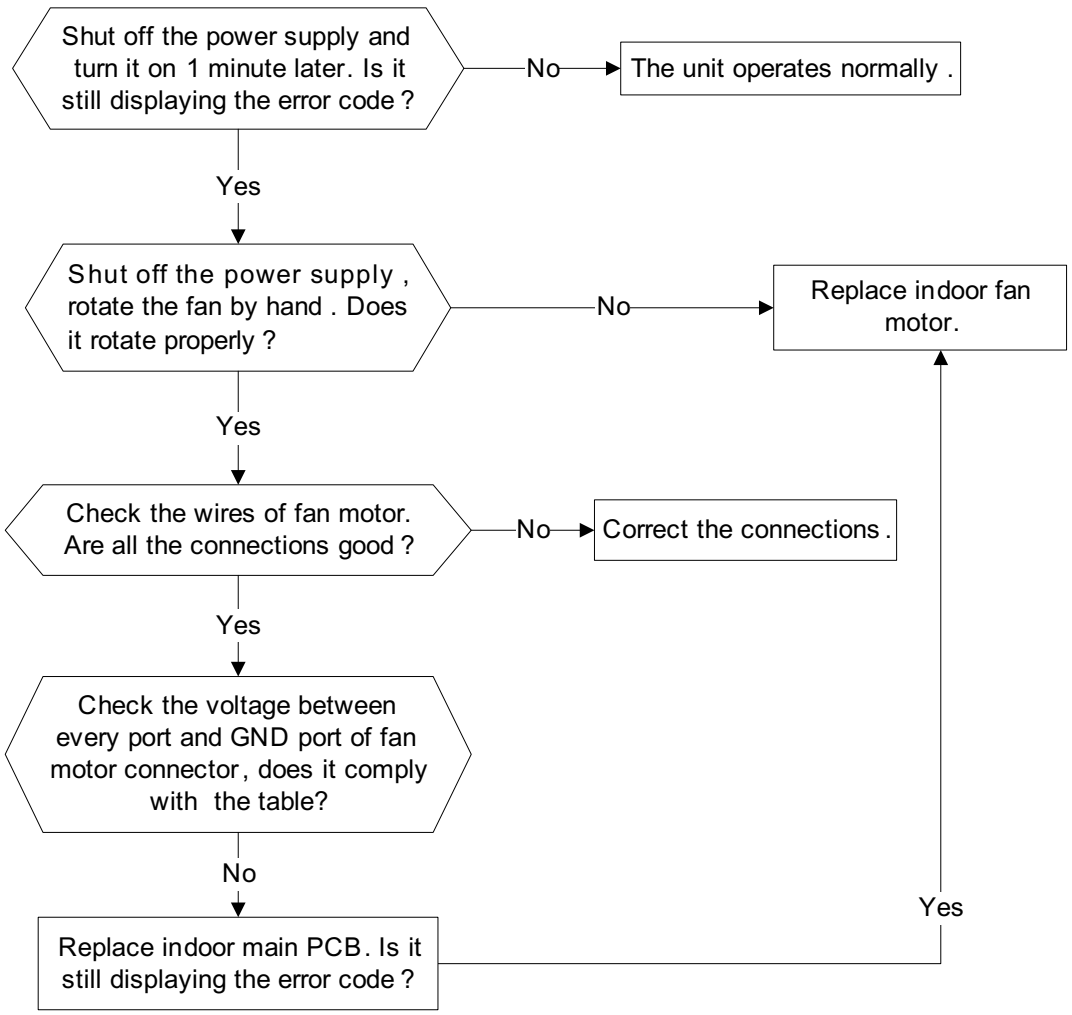
Shut off the power supply and turn it on 5 seconds later. Is it still displaying the error code ?



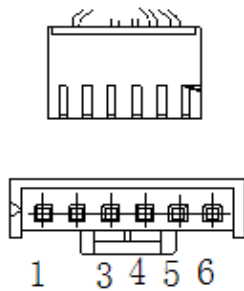
2.4.1.4. Full-water malfunction



2.4.1.5. Indoor fan Speed has been out of control. (Only for the units used DC motor)



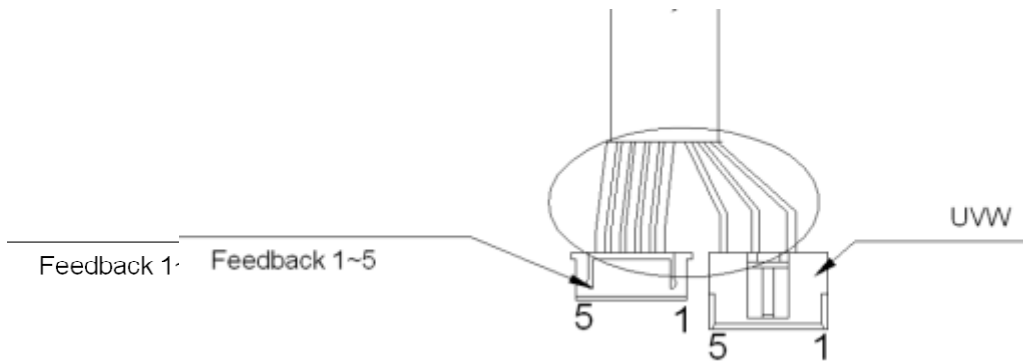
DC motor voltage input and output (control chip is inside the motor)



DC motor voltage input and output

NO.	Color	Signal	Voltage
1	Red	Vs/Vm	280V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	14-17.5V

Control chip is in main PCB



NO.	1	2	3	4	5
Color	Orange	Grey	White	Pink	Black
Signal	Hu	Hv	Hw	Vcc	GND

Color	Red	Blue	Yellow
Signal	W	V	U

- 1) Release the UVW connector. Measure the resistance of U-V, U-W, V-W. If the resistance is not equal to each other, the fan motor must have problems and need to be replaced. Otherwise, go to step 2.
- 2) Power on and when the unit is in standby, measure the voltage of pin4-5 in feedback signal connector. If the value is not 5V, change the PCB. Otherwise, go to step 3.
- 3) Rotate the fan by hand, measure the voltage of pin1-5, pin 2-5 and pin 3-5 in feedback signal connector. If any voltage is not positive voltage fluctuation, the fan motor must have problems and need to be replaced.

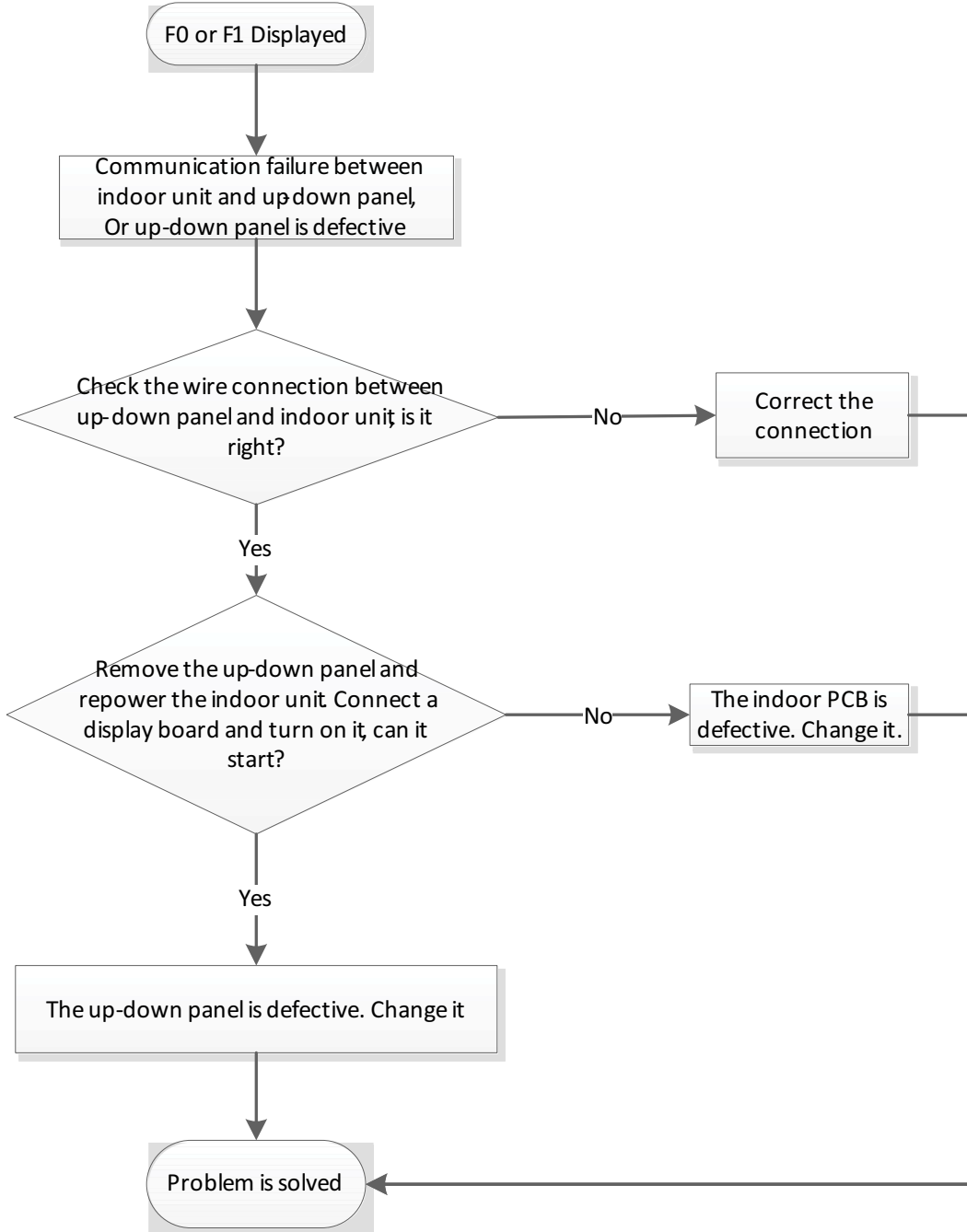
2.4.1.6. Inverter compressor drive protection (Only for compact cassette 12k & console 12k)

Refer to the outdoor unit P6 malfunction part to solve this problem.

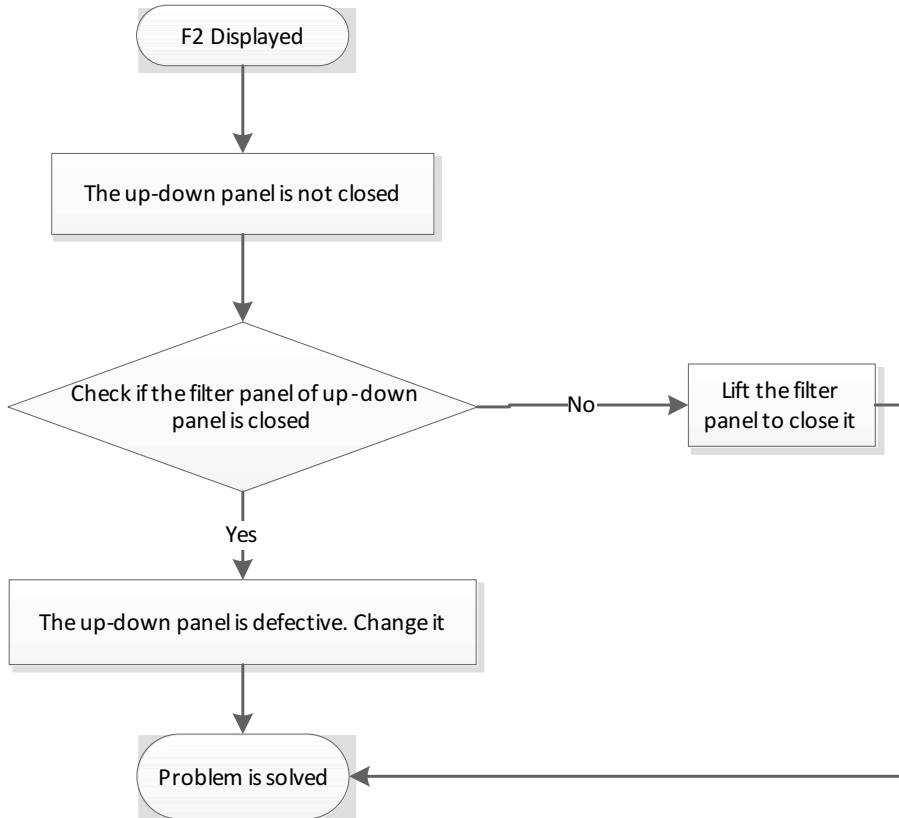
2.4.2 For the super-slim cassette with up-down panel

2.4.2.1 Communication error between indoor unit and up-down panel

2.4.2.2 Up-down panel is defective

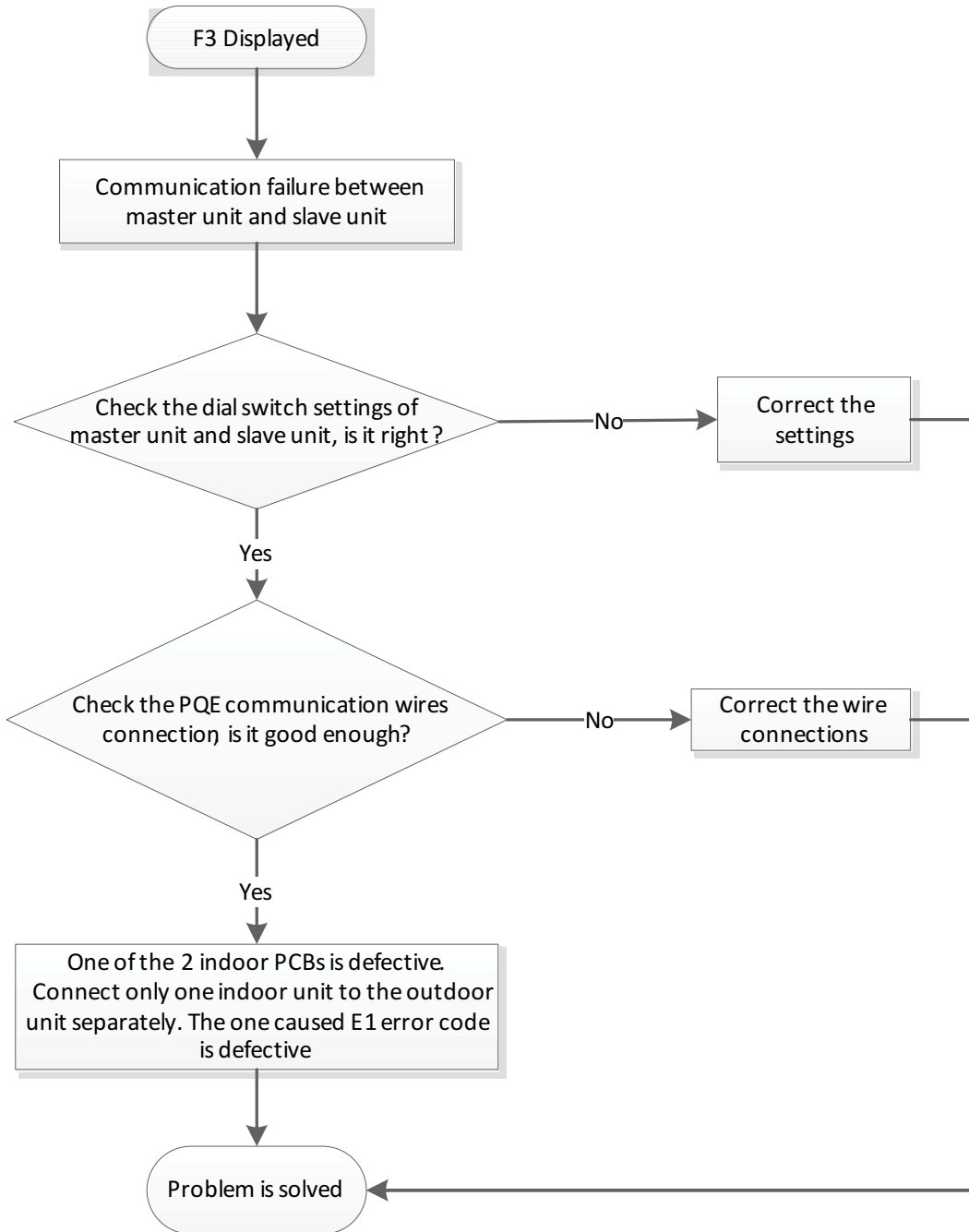


2.4.2.3 Up-down panel is not closed



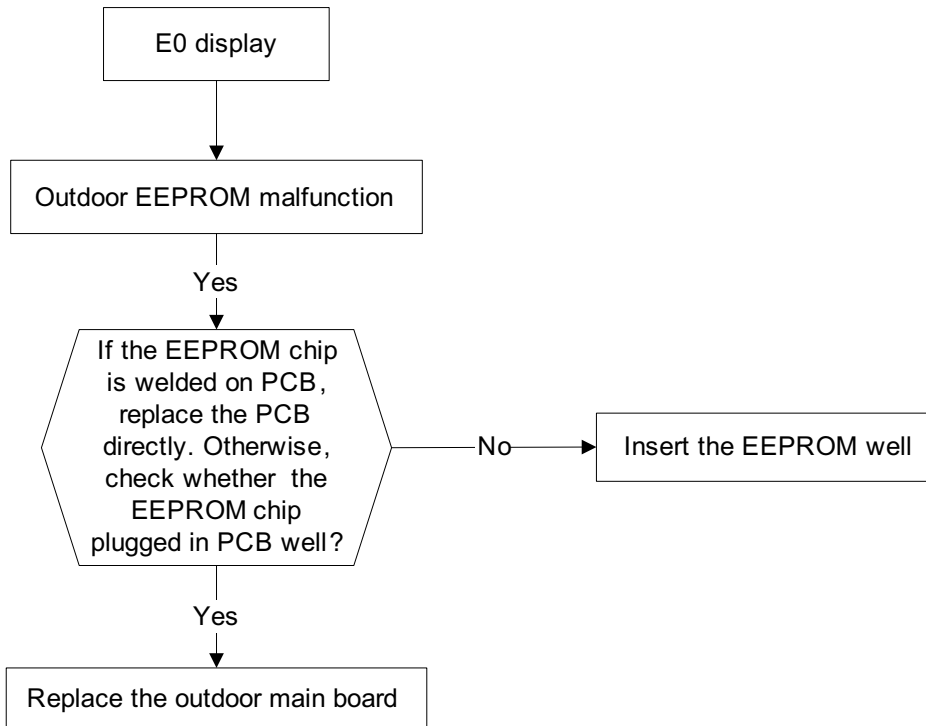
2.4.3 For the unit with TWINS function

2.4.3.1 Communication failure between master unit and indoor unit

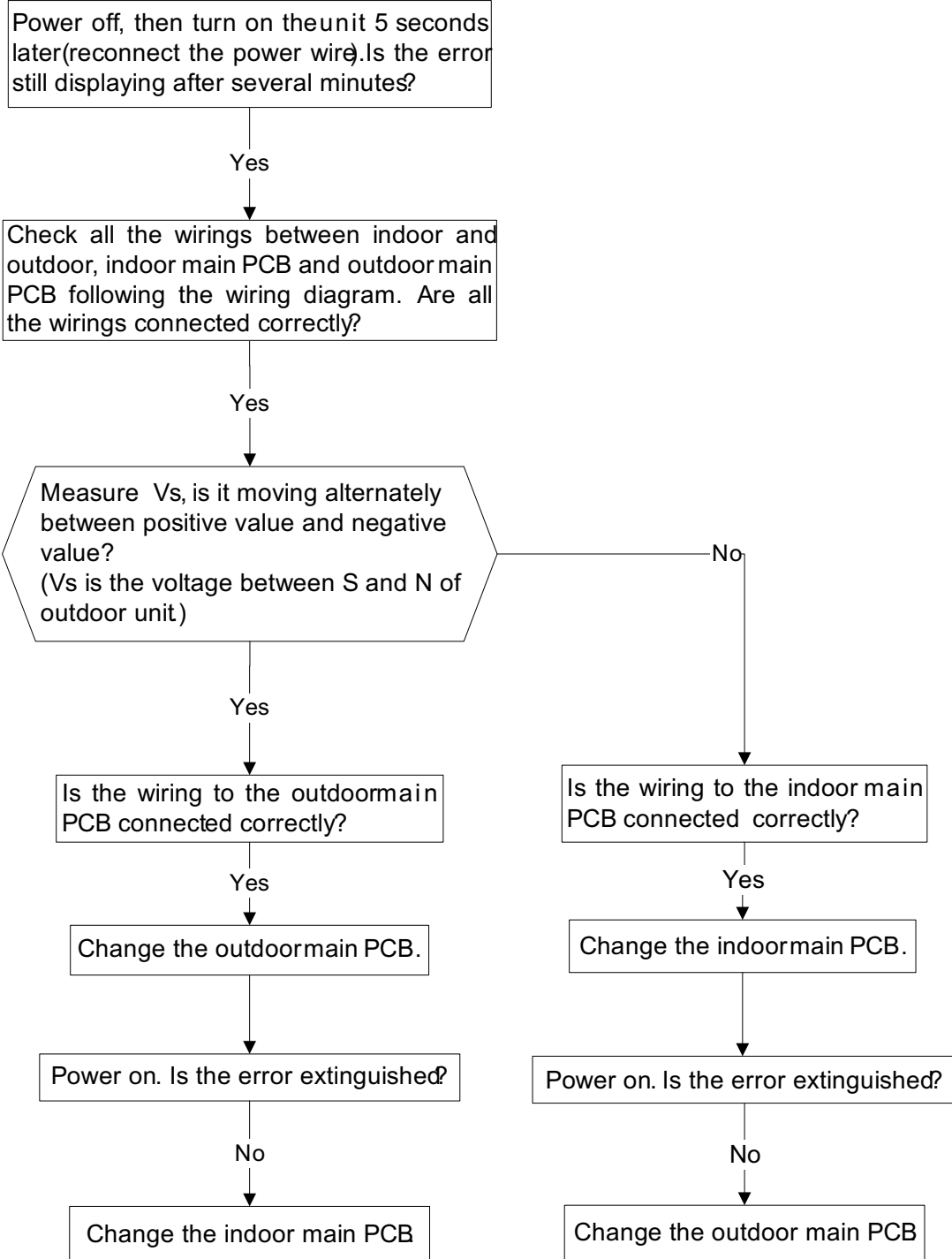


2.4.4 For the outdoor unit

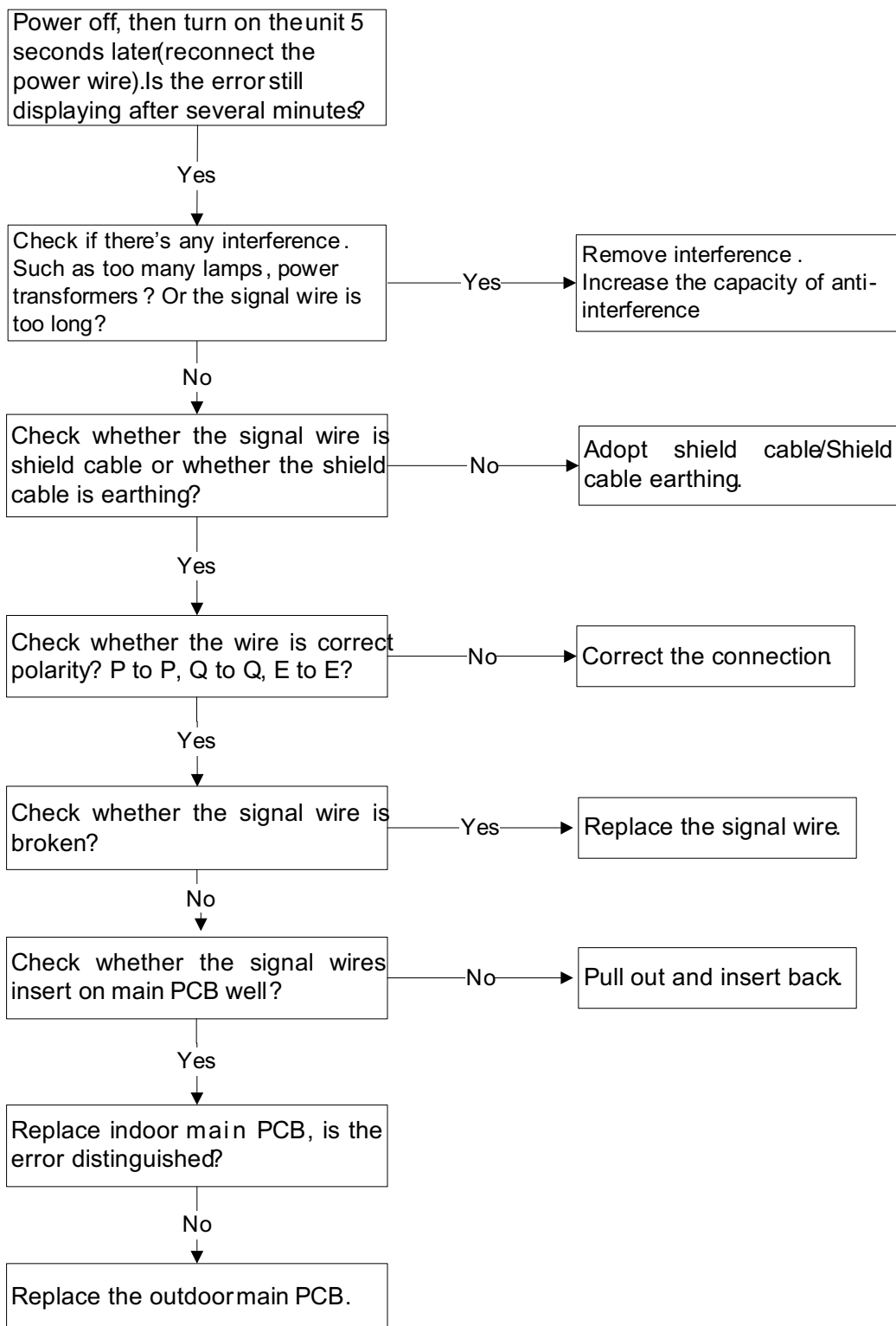
2.4.4.2. E0 malfunction



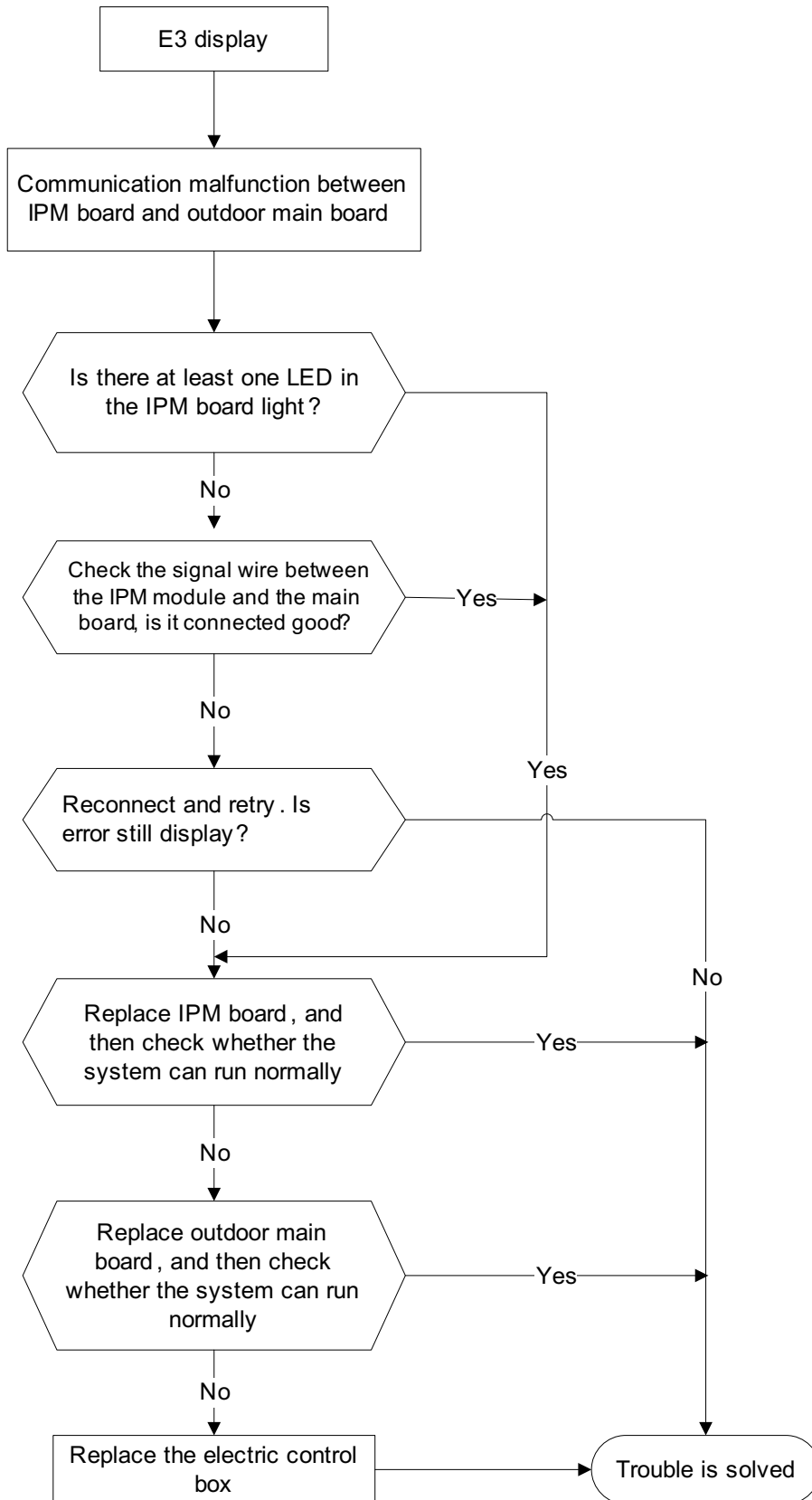
2.4.4.3. E2 malfunction (Only for 12k)



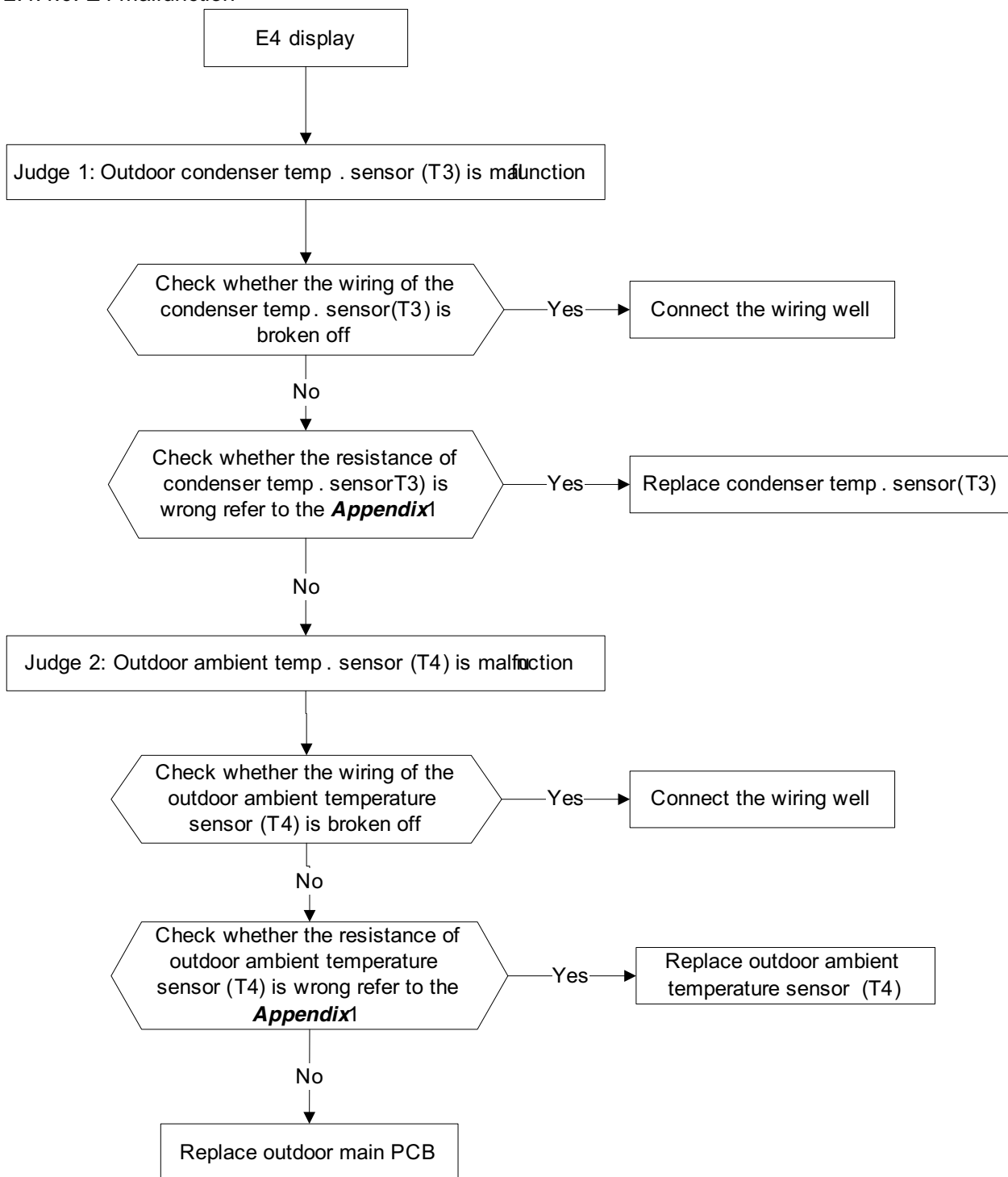
2.4.4.4. E2 malfunction (For 18-60k)



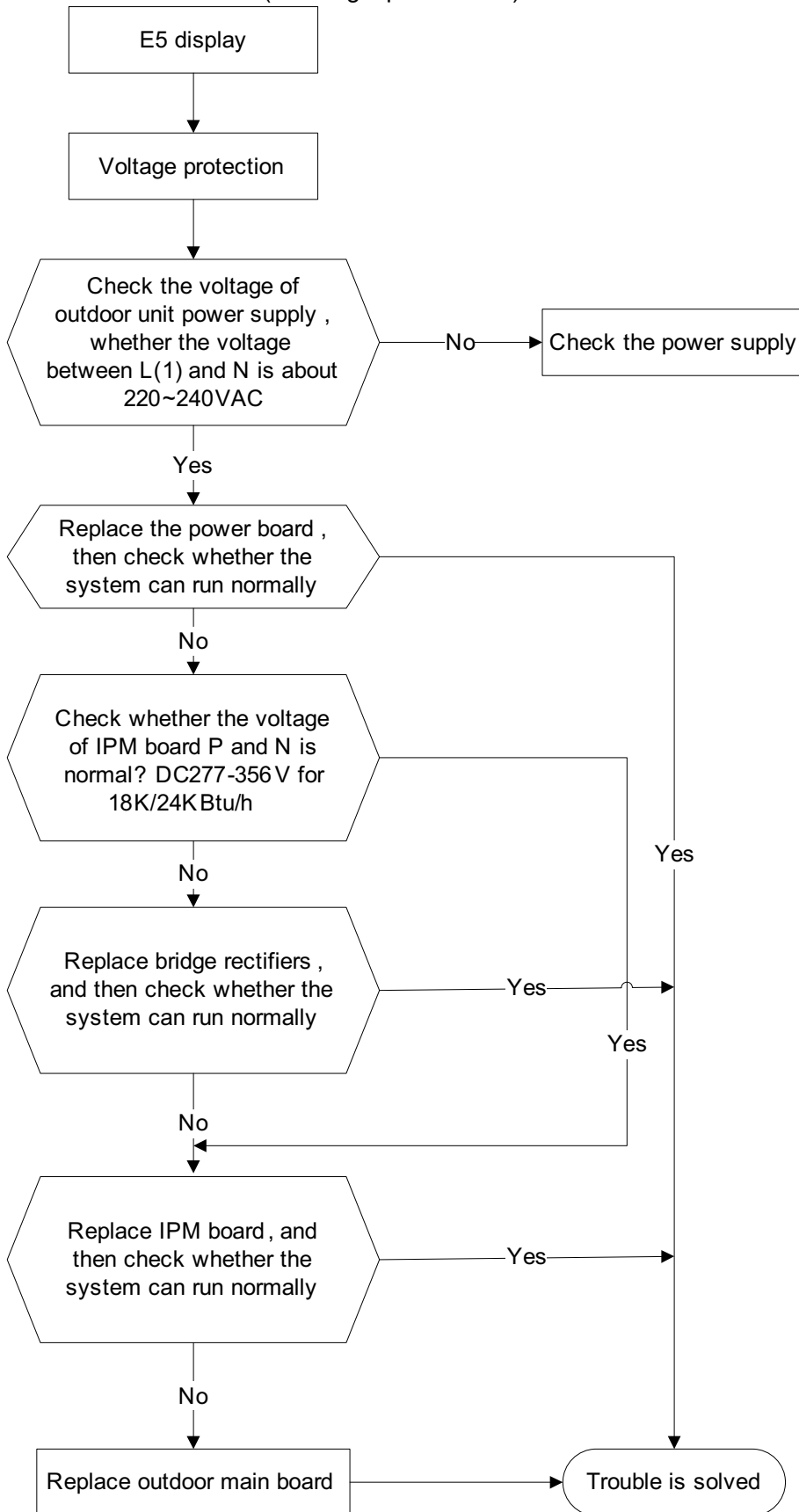
2.4.4.5. E3 malfunction



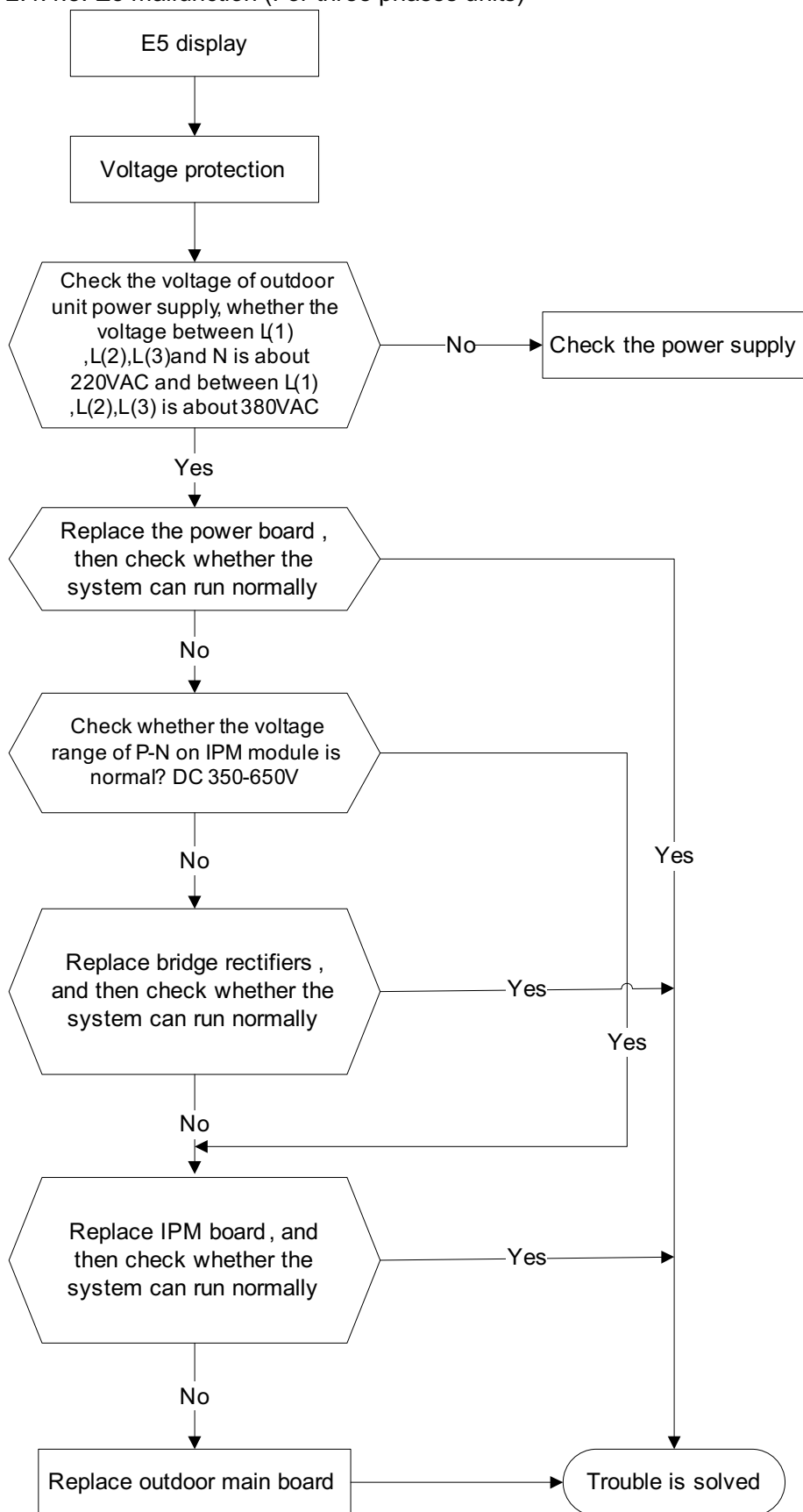
2.4.4.6. E4 malfunction



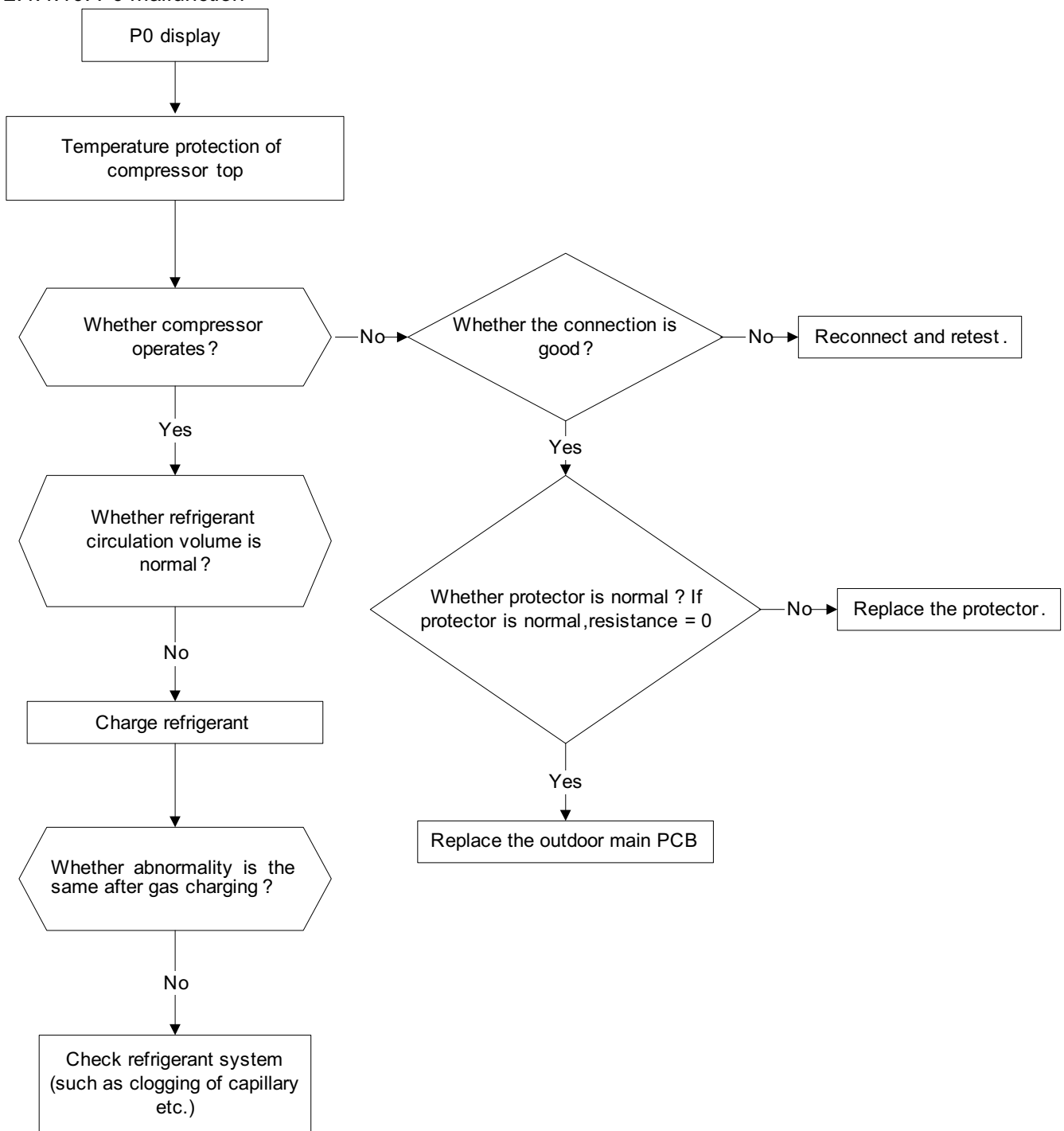
2.4.4.7. E5 malfunction (For single phase units)



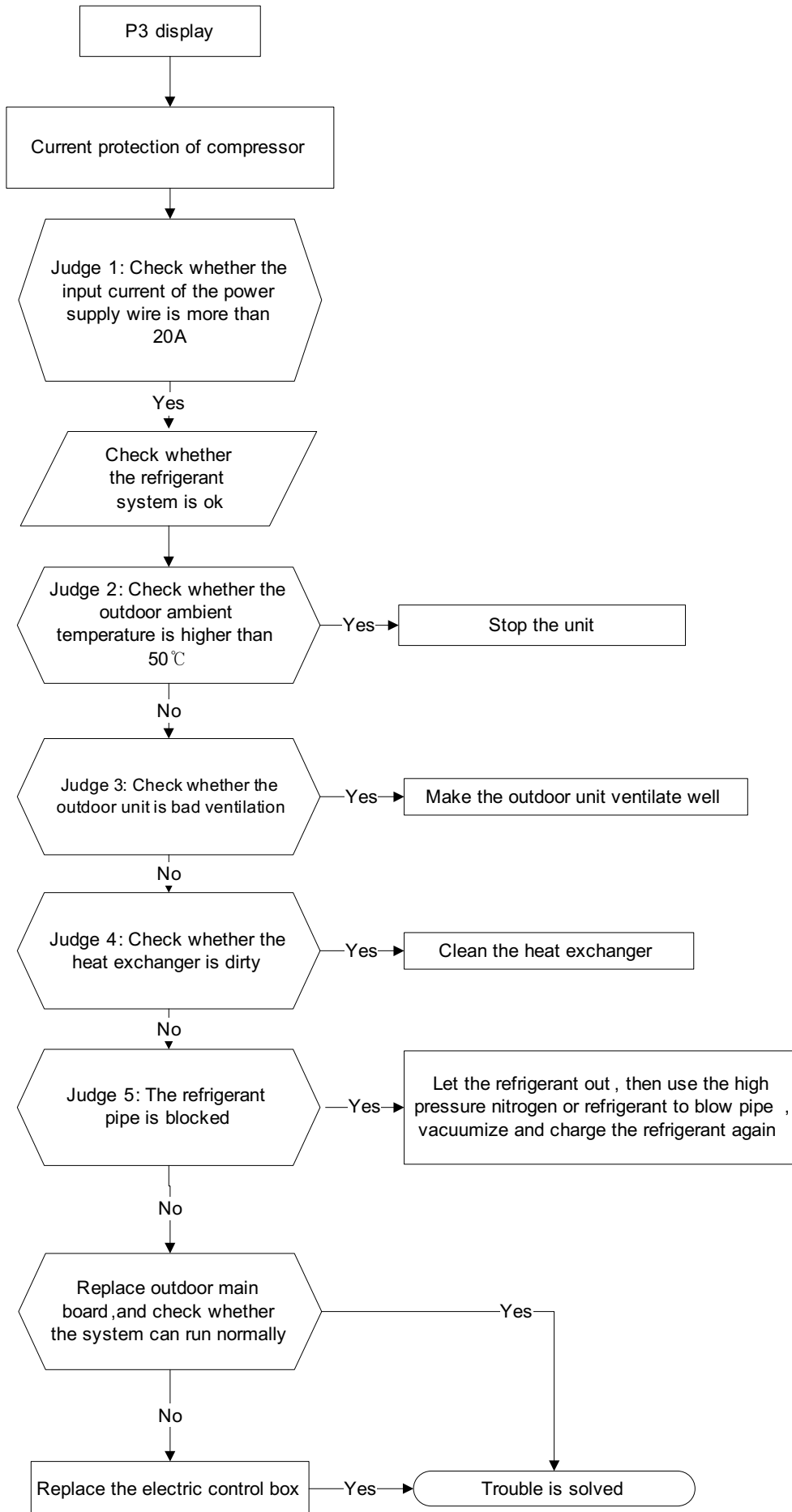
2.4.4.8. E5 malfunction (For three phases units)



2.4.4.10. P0 malfunction

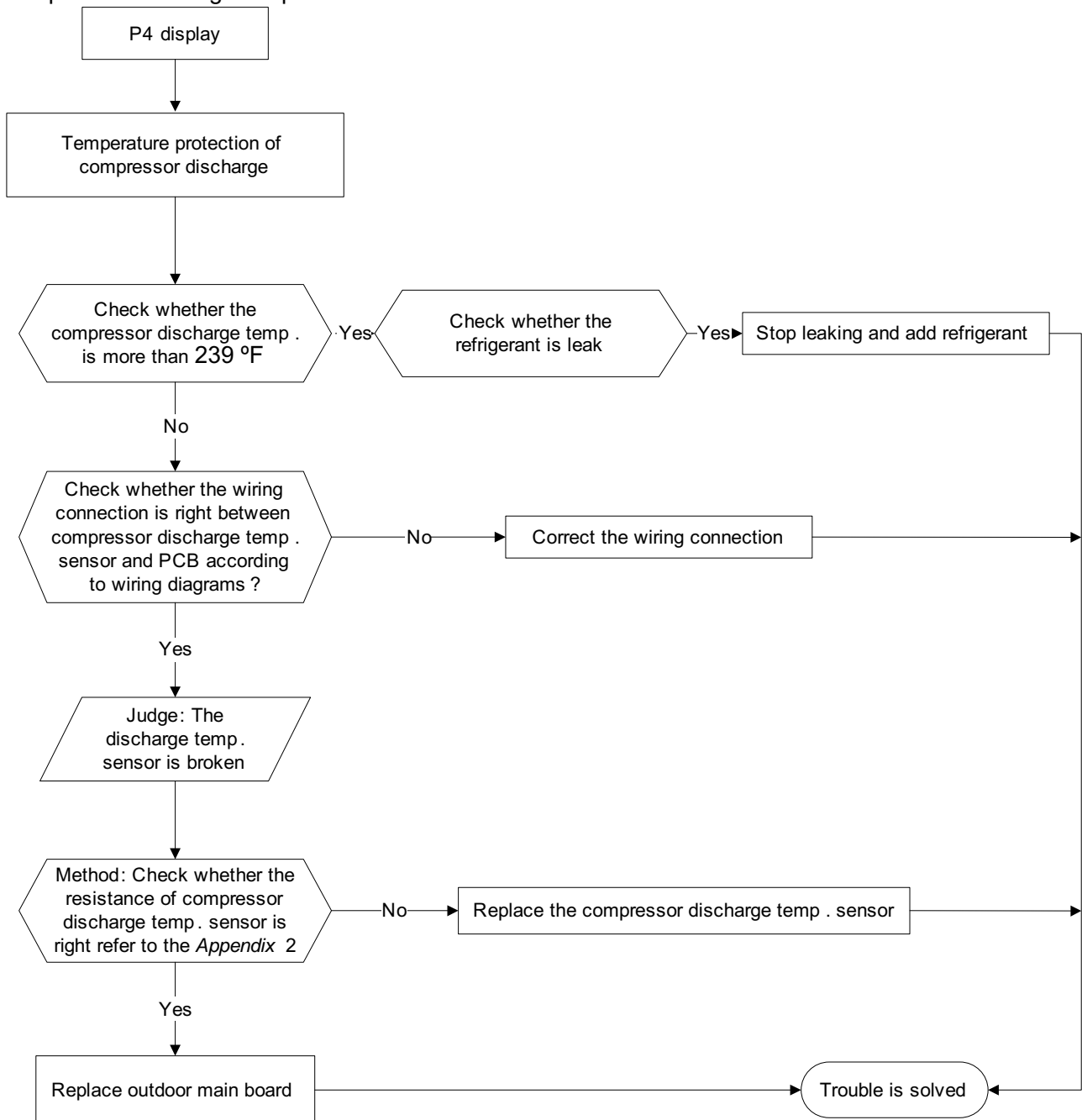


2.4.4.13. P3 malfunction



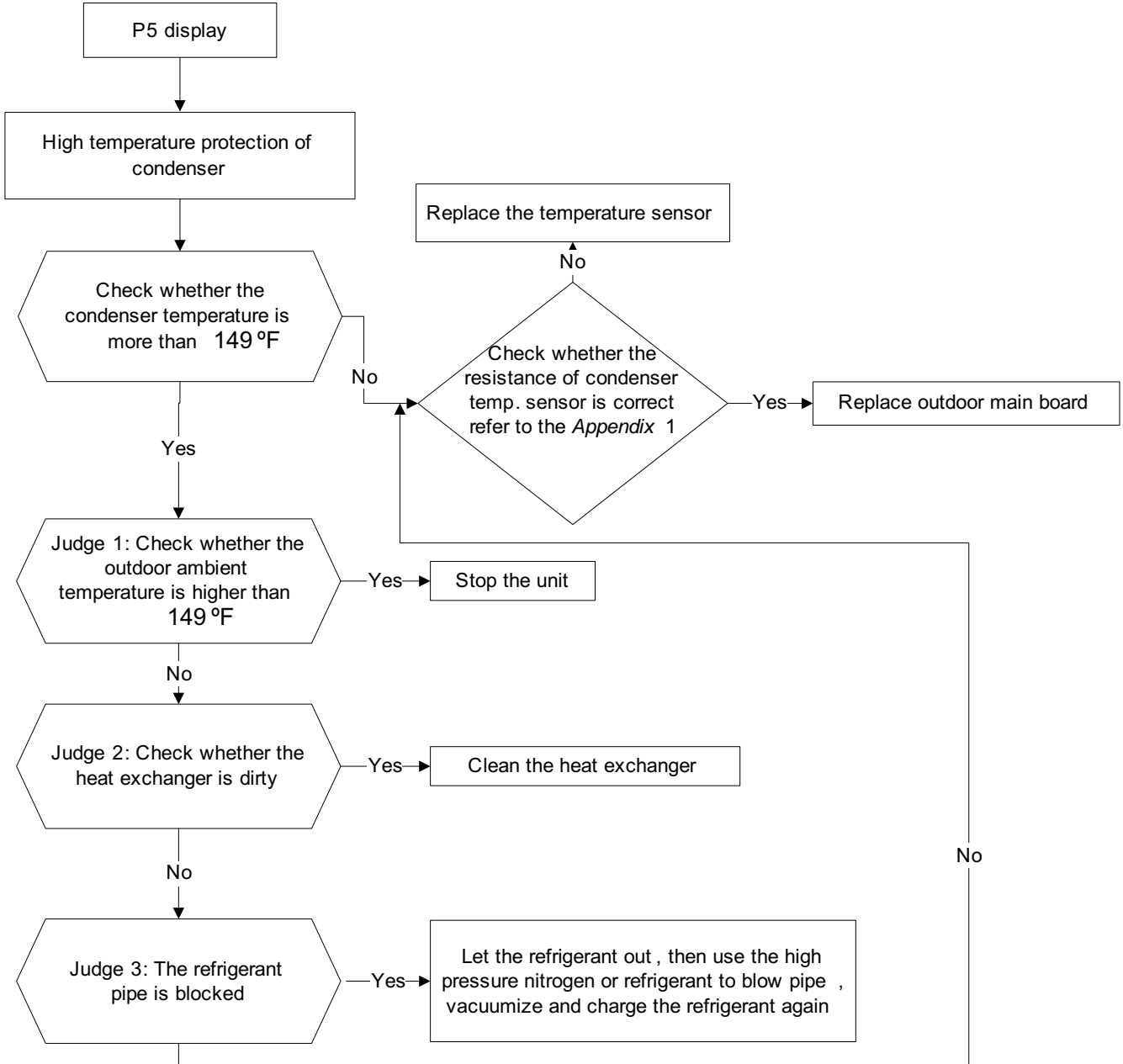
2.4.4.14. P4 malfunction

When compressor discharge temperature is higher than 239 °F, the unit will stop, and unit runs again when compressor discharge temperature is lower than 194 °F



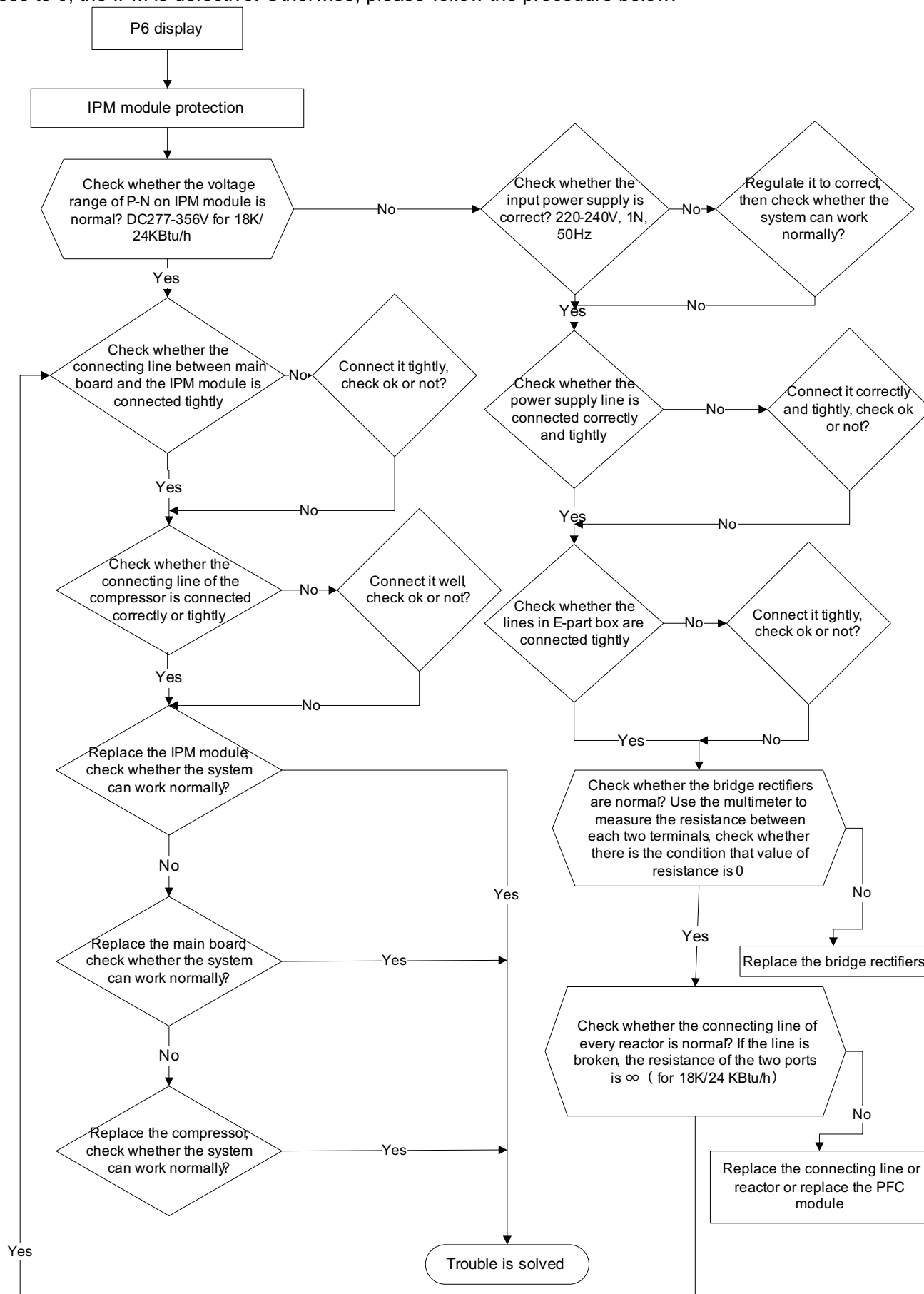
2.4.4.15. P5 malfunction

When condenser high temp. is more than 149 °F , the unit will stop, and unit runs again when outdoor pipe temp. less than 125 °F

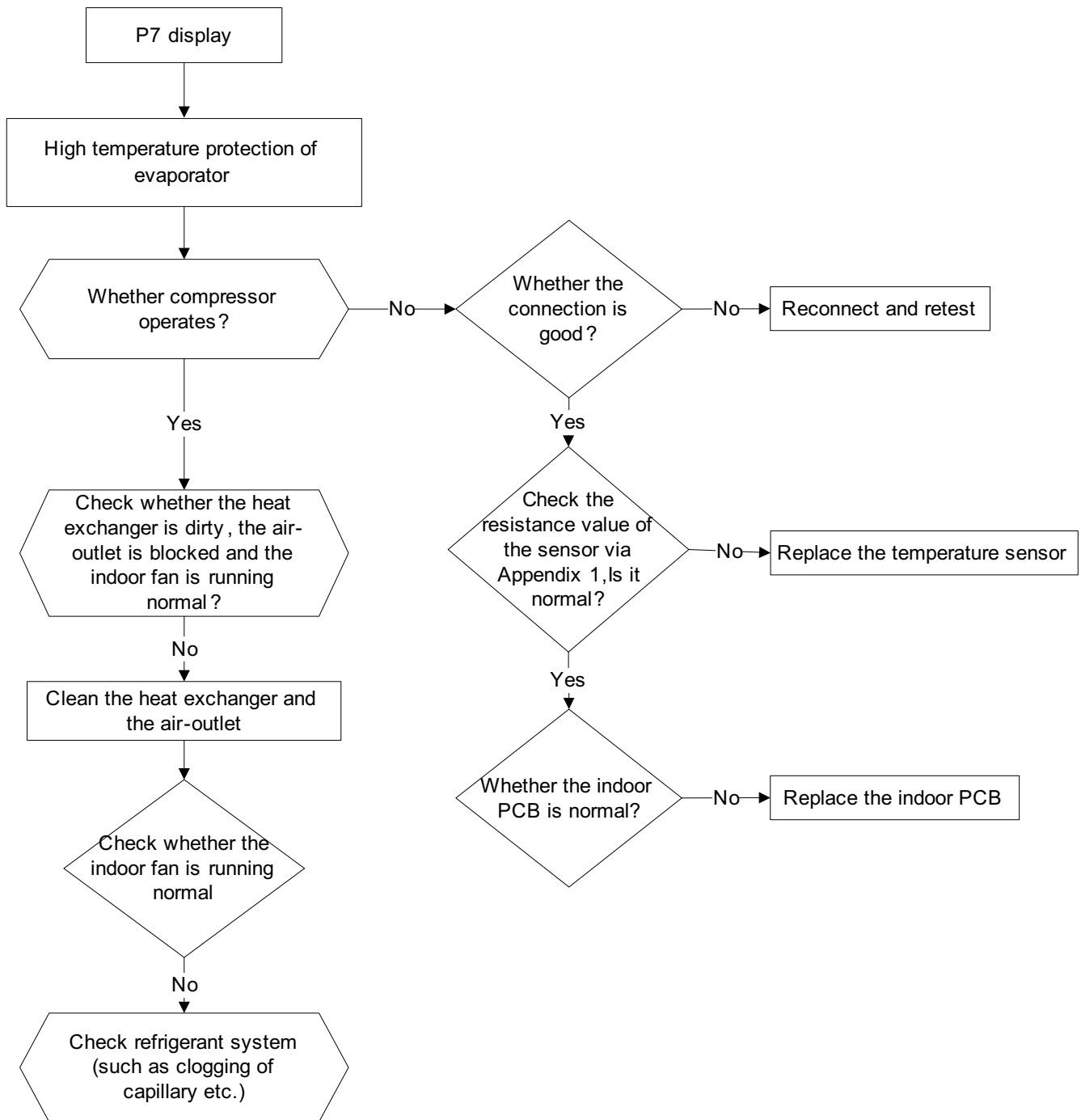


2.4.4.16. P6 malfunction (For single phase units)

At first test the resistance between every two ports of U, V, W of IPM and P, N. If any result of them is 0 or close to 0, the IPM is defective. Otherwise, please follow the procedure below:



2.4.4.18. P7 malfunction



Appendix 1 Temperature Sensor Resistance Value Table (C--K)

°C	K Ohm	°C	K Ohm	°C	K Ohm	°C	K Ohm
-20	115.266	20	12.6431	60	2.35774	100	0.62973
-19	108.146	21	12.0561	61	2.27249	101	0.61148
-18	101.517	22	11.5000	62	2.19073	102	0.59386
-17	96.3423	23	10.9731	63	2.11241	103	0.57683
-16	89.5865	24	10.4736	64	2.03732	104	0.56038
-15	84.2190	25	10.0000	65	1.96532	105	0.54448
-14	79.3110	26	9.55074	66	1.89627	106	0.52912
-13	74.5360	27	9.12445	67	1.83003	107	0.51426
-12	70.1698	28	8.71983	68	1.76647	108	0.49989
-11	66.0898	29	8.33566	69	1.70547	109	0.48600
-10	62.2756	30	7.97078	70	1.64691	110	0.47256
-9	58.7079	31	7.62411	71	1.59068	111	0.45957
-8	56.3694	32	7.29464	72	1.53668	112	0.44699
-7	52.2438	33	6.98142	73	1.48481	113	0.43482
-6	49.3161	34	6.68355	74	1.43498	114	0.42304
-5	46.5725	35	6.40021	75	1.38703	115	0.41164
-4	44.0000	36	6.13059	76	1.34105	116	0.40060
-3	41.5878	37	5.87359	77	1.29078	117	0.38991
-2	39.8239	38	5.62961	78	1.25423	118	0.37956
-1	37.1988	39	5.39689	79	1.21330	119	0.36954
0	35.2024	40	5.17519	80	1.17393	120	0.35982
1	33.3269	41	4.96392	81	1.13604	121	0.35042
2	31.5635	42	4.76253	82	1.09958	122	0.3413
3	29.9058	43	4.57050	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.32390
5	26.8778	45	4.21263	85	0.99815	125	0.31559
6	25.4954	46	4.04589	86	0.96681	126	0.30754
7	24.1932	47	3.88673	87	0.93662	127	0.29974
8	22.5662	48	3.73476	88	0.90753	128	0.29216
9	21.8094	49	3.58962	89	0.87950	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.27770
11	19.6891	51	3.31847	91	0.82643	131	0.27078
12	18.7177	52	3.19183	92	0.80132	132	0.26408
13	17.8005	53	3.07075	93	0.77709	133	0.25757
14	16.9341	54	2.95896	94	0.75373	134	0.25125
15	16.1156	55	2.84421	95	0.73119	135	0.24512
16	15.3418	56	2.73823	96	0.70944	136	0.23916
17	14.6181	57	2.63682	97	0.68844	137	0.23338
18	13.9180	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231

Appendix 2

Unit: °C---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°C)=5KΩ±3%	
18	75.24	58	14.62	98	3.927		
19	71.86	59	14.09	99	3.812		

Appendix 3:

°C	10	11	12	13	14	15	16	17	18	19	20	21	22
°F	48	50	52	54	56	58	60	62	64	66	68	70	72
°C	23	24	25	26	27	28	29	30	31	32	33	34	35
°F	74	76	78	80	82	84	86	88	90	92	94	96	98

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