

inverter mini chiller



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Troubleshooting

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1. Troubleshooting 1.1 PCB parts instructions

TMUN0010I1, TMUN0012I1 Main control panel



- 1. Transformer output port
- 2. Tin/Tb1/Tout/Tb2 temperature sensor port
- Note: Tin: water inlet temp. Tout: water outlet temp.
 - Tb1: Temp. 1 of plate heat exchanger Tb2: Temp.2 of plate heat exchanger
- 3. Radiator temperature sensor port(Reserved) (T6)
- 4. Discharge temperature sensor port
- 5.1 Outlet of outdoor heat exchanger temp. sensor port(T3)
- 5.2 Ambient temp. sensor port (T4)
- 6. Operation and display panel port
- 7.1 Low pressure switch
- 7.2 High pressure switch
- 8. Differential pressure valve port
- 9. Factory debug port
- 10. Wired controller port
- 11. Electric expansion valve port
- 12. Power supply input port L
- 13. Power supply input port N
- 14. Ground wire
- 15. Rectifier bridge input port N

- 16. Rectifier bridge input port L
- 17. 8A fuse tube
- 18. Solenoid valve port (Reserved)
- 19. Exhaust valve electric heater port
- 21. Plate heat exchanger electric heater
- 22. Differential pressure valve electric heater port
- 23. Built-in water pump port
- 24. Compressor electric heater
- 25. 4-way valve port
- 26. External pump/Remote alarm port
- 27. Transformer input port
- 38. P/N/+15V port
- 29. Communication port between IPDU and main PCB
- 30. Down DC fan port
- 31. Check touch switch
- 32. Up DC fan port
- 33. Force-cooling touch switch



PFC&IPM module



- a. Power supply port U of the compressor
 b. Power supply port V of the compressor
 c. Power supply port W of the compressor
 c. PFC output N

- 8. PFC inductance port L_1
- 9. PFC inductance port L_1
 9. PFC inductance port L_2
 10. PFC input N
- 11. IPM input N
- 12. Communication port to main control board

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TMUN0012I3, TMUN0014I3, TMUN0016I3 Main control board



- 1. Input port for switching power supply
- 2. Debugging port
- 3. Connection port for operation and display panel
- 4. Tin/Tb1/Tout/Tb2 temp. sensor port
- Note: Tin: water inlet temp. Tout: water outlet temp.
 - Tb1: Temp.1 of plate heat exchanger
 - Tb2: Temp. 2 of plate heat exchanger
- 5. Discharged temperature sensor port (Tp)
- 6.1 T3 temperature sensor port
- 6.2 T4 ambient temperature sensor port
- 7.1. Low pressure switch
- 7.2 High pressure switch

- 8. Checking touch switch
- 9. Force-cooling touch switch
- 10. Differential pressure valve port
- 11. Factory debugging port
- 12. Wired controller port
- 13. AC Current transformer
- 14."Remote on/off" and "remote cooling/heating" port
- 15. Electronic expansion valve port
- 16. AC 220V power supply port
- 17. Solenoid valve port (Reserved)
- 18. Exhaust valve electric heater port



- 19. Electric heater port of Plate heat exchanger
- 20. Electric heater port of differential pressure valve
- 21. Built-in water pump port
- 22. Electric heater of the compressor
- 23. Precharge AC contactor port
- 24. 4-way valve port
- 25. External water pump/Remote alarm port

IPM module

- 26. Up DC fan port
- 27. Down DC fan port
- 28. Power supply port for switching power supply of
- PFC board
- 29. Drive module port
- 30. P/N/+15V port



- 1. +15V output port
- 2. communication port to main control board
- 3. IPM input port N
- 4. Compressor connection port W

- 5. Compressor connection port V
- 6. Compressor connection port U
- 7. IPM input P
- 8. Power supply port for switching power supply



Filter board



- 3. Power input port L1
- 5. Ground wire

- 4. Power input port N
- 6. Loaded power supply port for main control board7. Power output port L1 after filtering
- 7. Power supply port for main control board

9. Power output port L2 after filtering

10.Power output port L3 after filtering

11. Ground wire



1.2 Function setting dial switches instructions

For 10kW

1	ON	OFF
SW4_1	With remote control function	Without remote control function
SW4_2	Reserved	Reserved

For 12-16kW

7		ON	
6		UN	UFF
	SW3_1	With remote control function	Without remote control function
2	SW3_2	Reserved	Reserved

1.3. Query function for PCB checking switch

Press checking touch switch on PCB to check the parameters. The check list on PCB is in table below.



Query content table on PCB

No.	Content	Note
0	Normal display	Clock displays when standby. Inlet water temperature displays when running. dF displays when defrosting. Pb displays when anti-freeze running. d0 displays when oil return, d8 displays when remote control is off.
1	Frequency	Display operating frequency when the unit is in cooling mode and heating mode.
2	Operating mode	0-Power off,1-water pump,2-cooling,3-heating,4-force cooling
3	Operating fan speed level	0-Power off (1-7)
4	The total required capacity before revised	Actual value (Force cooling displays 5)
5	Capacity requirements after revised	Actual value (Force cooling displays 5)
6	Temperature set	Actual setting temperature under cooling or heating mode
7	Т3	Actual value(Outlet temperature of outdoor heat exchanger)
8	T4	Actual value(Outdoor ambient temperature)
9	Тр	Actual value(Compressor discharged temperature)
10	Tin	Actual value(Water inlet temperature of plate heat exchanger)
11	Tout	Actual value(Water outlet temperature of plate heat exchangers)
12	Tb1	Plate heat exchanger anti-freezing temperature sensor 1
13	Tb2	Plate heat exchanger anti-freezing temperature sensor 2
14	Т6	Reserved (Cooling fin surface temperature(reserved)
15	Operation current	Actual value
16	Power supply voltage	Actual AD value
17	EXV Opening degrees	Step number×8
10	Model	5kW:5; 7kW:7; 10kW:10; 12kW:12; 14kW:14;16kW:16
10		(Operation panel has no such function)
19	Version number	(Operation panel has no such function)
20	Err 1	The last one malfunction code



1.4 Error code table 10-16kW

Error Code	Content	Note				
E9	EEPROM malfunction					
H0	Communication malfunctions between main chip and IPDU.					
E4	T3,T4 sensor malfunction					
E5	Voltage protection malfunction	The same as 5/7kW				
E6	E6 DC fan motor malfunction					
EA	EA A fan in the A region run for more than 5 minutes in heating mode					
Eb	There are two times E6 fault in 10 minutes (recovery after power off)					
C0	Inlet water temperature sensor malfunction for 10~16kW models.					
C1	Outlet water temperature sensor malfunction (10-16kW)					
F7	Sensor temperature 1 of plate heat exchangers for 10-16kW.	10-16kW				
F8	F8 Sensor temperature 2 of plate heat exchangers for 10-16kW.					
PL	Reserved for 10-16kW.	1				
P1	High pressure protection					
P2	Low pressure protection					
P3	Current protection of the compressor	The same as 5/7kW				
P4	Discharged temperature protection					
P5	P5 T3 high temperature protection of outdoor condenser					
P6	IPDU module protection]				
P8	Typhoon protection					
СН	Protection when water temperature is too high in heating mode.					
CL	To low water temperature protection in heating mode for 10-16kW	10-16kW				
CP	Anti-idling protection for water pump					
Pb	System anti-freeze protection					
C8	Water flow switch protection malfunction	The same as 5/7 KW				
PH	Protection when temperature difference between inlet water & outlet water is too large for 10-16kW.	10-16kW				
dF	Defrosting	The same as $5/7k$				
d8 Remote control		The same as S//KVV				



DC Inverter Mini Chiller 50Hz



1.5.2 H0





1.5.3 E4, C0, C1, F7, F8









1.5.6 P1

When the pressure is over 4.4MPa, the system will display P1 protection, the ODUs will be standby. When the pressure is lower than 3.2MPa, P1 protection is finished and normal operation resumes.





1.5.7 P2

When the pressure is lower than 0.14MPa, the system will display P2 protection, the ODUs will be standby. When the pressure is higher than 0.30MPa, P2 protection finished and normal operation resumes.



Note:

* The phenomenon of insufficient refrigerant

Top temperature and discharge temperature of all compressors are higher than normal value, discharge pressure and suction pressure are both lower than normal value, current is lower than normal value, suction pipe may be frosting. The entire phenomenon will disappear after recharging refrigerant.

* The phenomenon of low pressure side blockage

The discharge temperature is higher than normal value, low pressure is lower than normal value, current is lower than normal value and suction pipe may be frosting.



1.5.8 P3

When current is over the specific value (single phase unit 10/12kW 30A, three phase unit 15A), the system will display P3 protection, the ODU in standby.

When the current goes back to normal range, P3 disappears and normal operation resumes.





1.5.9 P4

When the discharge temperature is higher than 115°C, the system will display P4 protection, the ODUs will be standby.

When the discharge temperature is lower than 83°C, P4 protection finished and normal operation resumes.





1.5.10 P5

When condenser temperature is over 62°C the system will display P5 protection, the ODUs will standby. When the condenser temperature goes back to normal range, P5 protection finishes and normal operation resumes.



1.5.11 P6

P6: IPM module protection

When P6 error code occurs, specific error code (L0/L1/L2/L4/L5/L7/L8/L9) displayed on digital tube. **Specific error code for inverter module**



1) L0 troubleshooting

Step 1: Compressor check

Measure the resistance between each two of U, V, W terminals of the compressor, all resistance levels should be the same and equal to 0.9~5 Ohms. (Fig. A and Fig. B)

Measure the resistance between each of U, V, W terminals of the compressor and ground (Fig. C), all the resistance should be infinite (Fig. D), otherwise the compressor has malfunctioned and needs to be replaced.



DC Inverter Mini Chiller 50Hz





Fig.C



Fig.D

Fig. A Fig.B If the resistance values are normal, then go to step 2.

Step 2: Module check



1) DC voltage between terminal P and terminal N should be 1.41 times the local power supply voltage.

2) DC voltage between terminal 1 and 2 should be $510V \sim 580V$.

3) Disconnect the terminal 3, 4, and 5 from inverter compressor. Measure the resistance between any two terminals among terminal 1, 2, 3, 4, and 5. All the values should be infinite. If any of the value approximates to 0, the inverter module is damaged and should be replaced.

Then replace the inverter module.



DC Inverter Mini Chiller 50Hz



Before replace module panel, the two places in red frame are needed to paint a slim layer of thermally conductive silica gel.

Thermally conductive silica gel

Step 3: DC detective wire check (if the unit has change the PCB or reconnect the wire, the following item should be checked)

Direction of the current in DC supply wire which is running through the inductor should be the same as the direction of arrow marked on the inductor.

2) L1/L4 troubleshooting

Step 1: Check the DC voltage between terminal 1 and 2, the normal value should be 510V~580V, if the voltage is lower than 510V, go to step 2.

Step 2: Check for rectifier wiring circuit. If wires are loose, fasten the wires. If wires are OK, replace the main PCB.

3) L2 troubleshooting

Step 1: Check the DC voltage between terminal 1 and 2, the normal value should be 510V~580V, if the voltage is higher than 580V, go to step 2.

If the value is not in the range, this indicates a problem with the electrolytic capacitor power supply, check the power supply for high or unstable voltage.

If the voltage value is normal, then the main PCB has malfunctioned, it needs to be replaced.

L8/L9 troubleshooting 4)

Step 1: Compressor check

Measure the resistance between each two of U, V, W terminals of the compressor, all the resistance should be the same and equal to 0.9~5 Ohms. (Fig. A and Fig. B)

Measure the resistance between each U, V, W terminal of the compressor and ground (Fig. C), all the resistance should be infinite (Fig. D), if not the compressor has malfunctioned and needs to be replaced.

Fig. A

Fig.B If the resistance values are normal, then go to step 2.

Fig.C

Step 2: Disconncet the power wiring from the compressor, replace the main PCB of the unit and ensure correct wiring, if compressor can start normally, it means the main PCB which was replaced was damaged. If compressor still can't start normally, replace the compressor.

Step 3: Replace the compressor

1.5.12. P8

1.5.15 C8&CP

2. Accessories

ltem	Name of accessory	Qty.	Shape
1	Installation and operation manual	1	
2	Rubber sealed ring	2	
3	Outlet connection pipe	1	
4	Straight screwdriver	1	

3. Optional Accessories

No.	Name	Specification	Remark
1	Wired controller	KJR-120F/BMK-E (with Midea logo)	Customized
2	Wired controller	KJR-120F1/BMK-E (without Midea logo)	Customized

4. Appendix

Temperature-Resistance characteristic sheet for pipe temperature sensor, ambient temperature sensor, inlet water temperature sensor and outlet water temperature sensor. Sensor characteristic sheet Unit: Temp:°C--K, Ratio:KΩ

sor characteristic sheet		Unit: Ter	np:°CK, Ratio:K	Ω	Γ		
Temp.	Ratio	Temp.	Ratio	Temp.	Ratio	Temp.	Ratio
-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	11.5	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	84.219	25	10	65	1.96532	105	0.54448
-14	79.311	26	9.55074	66	1.89627	106	0.52912
-13	74.536	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	0.486
-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	36	6.13059	76	1.34105	116	0.4006
-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	1.2133	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	4.5705	83	1.06448	123	0.33246
4	28.3459	44	4.38736	84	1.03069	124	0.3239
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	0.8795	129	0.28482
10	20.7184	50	3.45097	90	0.85248	130	0.2777
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	13.918	58	2.53973	98	0.66818	138	0.22776
19	13.2631	59	2.44677	99	0.64862	139	0.22231

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