JOYONWAY
BY BALBOA

Heat pump controller
热泵控制系统

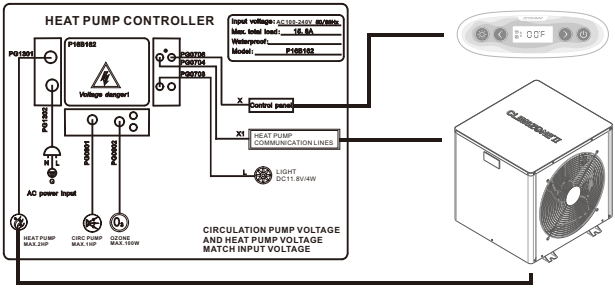
P16B162
PB557-02

Simplified operation instruction
简易操作说明书

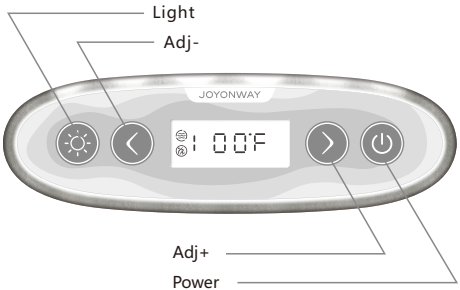
V2.2 English/中文

I. Pre-use operations

1、Please connect power strictly according to the power data plate.



2. After connecting the load and checking it in detail, turn on the power and use it normally.



P16B162 parameter:

Input voltage: AC100-240V 50/60Hz
Max. total load: 15.8A

II Functions

1、Power

When the control system is powered on, press "  " for one second to turn on or off the system.

2、Temp unit

When the control system is turned on, press "  " and " " at the same time to change the temp unit. (℃ or ℉). The system will store the setting.

3、Temp adjustment

When the control system is turned on, press "  " to increase the setting temp and press "  " to decrease the setting Temp.

Setting temp range: 5-40℃ (40-104℉)

4、Light

4.1、When the control system is turned on, press "  " to control the light. In RGB mode,Press and hold "  " for 2 seconds to turn off the light directly.

4.2、Within 5 minutes after the system is powered and control system is turned off, press and hold "  " for 8 seconds to change the working mode of the light. (on/off mode and RGB mode)(this function is only used for configuring in factory.)

4.3、In on/off mode, only on and off of the light can be controlled.

4.4、In RGB mode, the working pattern is as follows:

State1: automatic color change (cycle through state 2-8)
State 2: red
State 3: green
State 4: yellow(green+red)
State 5: blue
State 6: purple(blue+red)
State 7: cyan (blue+green)
State 8: white

5、Children lock

When the control system is turned on, long press the "  " button for 5 seconds to turn on or off the child lock function. When the child lock function is turned on, it briefly displays "LON", and when the child lock function is turned off, it briefly displays "LOF". After turning on the child lock function, if there is no button operation within 3 minutes, the button will be locked and displayed as "LOCK". After locking, long press any key (except for the unlock key) for 3 seconds to unlock this lock.

6、Circ pump

When the control system is turned on, the circ pump will run automatically. When the heat pump is running, the circ pump also runs. After the heat pump is turned off, the circ pump will shut down after a delay of 2 minutes. If the circ pump has not been running within 1 hour, it will automatically run for 1 minute.

7、Ozone

6.1、The ozone will turn on and off automatically according to the control system state.

6.2、When the circ pump is running, zone will turn on. Then the circ pump is turned off, the ozone will turn off automatically.

8、Heating

8.1、When the control system is turned on, heating will be on automatically.

8.2、When heating is turned on, circ pump will be started in advance. Then heat pump will run. When heating is turned off, heat pump turns off in advance and then circ pump.

8.3、When heating is turned on, the control system will automatically control the water temp by starting and stopping the heat pump according to water temp and setting temp.

8.4、Temp control regulation (when the system is turned on):

When water temp≥ set temp+1℃, then cooling function of the heat pump will be started.

When water temp ≥ set temp-1℃, then heating function of the heat pump will be started.

When water temp≥ set temp, then heat pump stops working.

III System malfunction table

malfunction code	malfunction description	solution
F10	The control panel cannot communicate with the control mainframe	Check the connecting wire between the control panel and the control main unit. Replace if necessary.
F11	The control mainframe cannot communicate with the cycle pump	Please check the connecting wire between the control main unit and the heat pump and replace it if necessary. Or please check if the heat pump is powered.

Heat Pump ER03: Water flow failure

Water flow failure

Cause:
1. The water flow switch fault
2. Low water flow
3. The inlet and outlet water are reversed
4. There is air in the pipe
5. The pipe blocked

Action:
1. Check the water flow switch and replace it if it is faulty
2. Check the water valve and the temperature difference between inlet and outlet water
3. Whether the inlet and outlet water pipes are correctly connected
4. Emptying water system
5. Pipe cleaning

Heat Pump ER04: Winter anti-freezing

Winter anti-freezing

Cause:
The ambient temperature is lower than the antifreeze setting value
Action:
Normal protection procedure

Heat Pump ER09: Communication with the upper computer failed

Communication with the upper computer failed (Communication with Balboa system failed)

Cause:
Action:
1. Replace the main board
2. Check the communication cables between the main board and Balboa system
3. Check whether the Balboa system software matches

Heat Pump ER05: High pressure protection

High pressure protection

Cause:
1. Low water flow
2. Pressure switch fault
3. The fan motor unwork or the speed too low
4. Overcharged the refrigerant

Action:
1. Check whether the temperature difference between inlet and outlet water is too large, and whether the outlet water temperature is too high
2. Use a multimeter to check whether the high voltage protection switch works
3. Check the water flow of the water pump and the speed of the fan
4. Refill the refrigerant

Heat Pump ER06:

Low Pressure Failure

Cause:

Action:

Heat Pump ER10: Communication fault of frequency conversion module

Communication fault of frequency conversion module (alarm when communication is disconnected between external board and drive board)

Cause:
1. The mainboard or driver board damaged
2. The connector of the communication cable between the mainboard and the driver board is in poor contact or falls off
3. The communication cable is damaged

Action:
1. Replace the main board or driver board
2. Check the communication cables between the main board and driver board
3. Replace the communication cable

Heat Pump ER12: Exhaust too high protection

Exhaust too high protection

Cause:
1. Less refrigerant or leakage
2. The system blocked
3. Compressor refrigerant oil is insufficient
4. The resistance value of the exhaust probe is offset, and the inlet temperature probe is dropped

Action:
1. Refill the refrigerant
2. Replace the filter
3. Add refrigerant oil to the compressor
4. Replace the exhaust probe and reconnect the water inlet temperature probe

Heat Pump ER15: Inlet water temp. Error

Inlet water temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the water inlet temperature sensor (T2 sensor)

Heat Pump ER16: Outer coil pipe temp. Error

Outer coil pipe temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the coil pipe temperature sensor(T3)

Heat Pump ER18: Exhaust gas temp. Error

Exhaust gas temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the exhaust gas temperature sensor(T1)

Heat Pump ER19:

DC Fan Motor Failure
Cause:
Action:

Heat Pump ER20: Abnormal protection of frequency conversion module

Abnormal protection of frequency conversion module
Cause:
IPM module internal fault, check related problems according to the attached table
Action:

Heat Pump ER21: Ambient temp. Error

Ambient temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the ambient temperature sensor(T4)

Heat Pump ER23:

Cooling outlet water temperature low protection
Cause:
Action:

Heat Pump ER27:
Outlet temperature fault

Outlet temperature fault
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the water outlet temperature sensor(T6)

Heat Pump ER29:
Return gas temp. Error

Return gas temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the suction gas sensor(T5)

Heat Pump ER32:
Heating outlet water high temperature protection

Heating outlet water high temperature protection
Cause:
Action:

Heat Pump ER33:
Outer Door Coil High Temperature Protection

Outer Door Coil High Temperature Protection
Cause:
Action:

Heat Pump ER35:
Compressor Current Protection

Compressor Current Protection
Cause:
Action:

Heat Pump ER42:
Internal Coil Temperature Failure

Internal Coil Temperature Failure
Cause:
Action:

Heat Pump ER44:
Ambient Temperature Too Low Protection

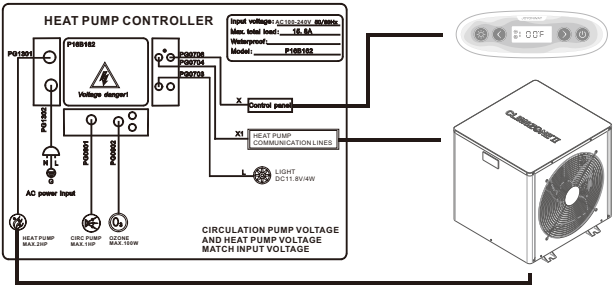
Ambient Temperature Too Low Protection
Cause:
Action:

Heat Pump ER46:
DC Fan Error

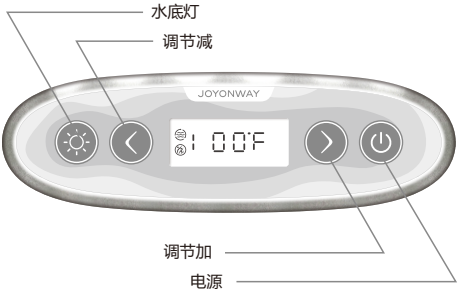
DC Fan Error
Cause:
1.Dc fan failure
2.Plug is in poor contact or off
Action:
1. Replace the DC fan
2. Reconnect cables to the DC fan

一、使用前的操作

1、根据功能，在控制系统接线图如下：



2、连接好负载详细检查以后，通电正常使用。



P16B162主机电气参数

输入电压： AC100-240V 50/60Hz
最大负载：15.8A

二、功能操作

1、开关机

在控制系统上电后，长按“  ”键2秒，可以开启或关闭系统。

2、温度单位

在控制系统上电开机状态下，通过同时触摸“  ”和“  ”键，可改变温度单位（℃或℉）。系统将对温度单位进行存储。

3、温度调节

在控制系统上电开机状态下，通过触摸“ ”键，可以增加设定温度；通过触摸“ ”键，可以减少设定温度。

正常设置温度为5-40℃（40-104℉）。

4、水底灯

4.1、在系统上电开机状态下，通过触摸“  ”键，可以控制水底灯。在RGB模式下，触摸“ ”键2秒，可以快速关闭水底灯。

4.2、在系统上电5分钟内，在关机状态下，通过触摸“ ”键8秒，可以改变水底灯的工作模式（开关模式和RGB模式）。（此功能只供工厂配置使用）

4.3、水底灯开关模式下，只是控制水底灯的打开和关闭。

4.4、水底灯RGB模式下，控制规律如下：

状态1 自动变色（在以下颜色2-8之间循环变色）

状态2 红色
状态3 绿色
状态4 黄色（绿色+红色）
状态5 蓝色
状态6 紫色（蓝色+红色）
状态7 青色（蓝色+绿色）
状态8 白色

5、童锁保护

在控制系统上电开机状态下，长按“  ”键5秒，打开或关闭童锁功能，童锁功能打开时短暂显示 ”LON",童锁功能关闭时短暂显示 ”LOF"。打开童锁功能后，3分钟内没有按键操作，将锁定按键并显示“LOCK"。锁定后，长按任意键（除开关键）3秒，将解开本次锁定。

6、循环泵

在控制系统上电开机状态下，循环泵将自动运行。热泵运行时，循环泵也运行，热泵关闭后，循环泵延时2分钟关闭。如循环泵在1小时内没有运行过，将自动运行1分钟。

7、臭氧消毒

7.1、臭氧消毒会根据系统状态自动开启或者关闭。

7.2、循环泵启动时，臭氧消毒自动打开；循环泵关闭时，臭氧消毒自动关闭；

8、恒温功能

8.1、在控制系统上电开机状态下，恒温功能将自动启动。

8.2、恒温开启时，循环泵提前启动，稍后热泵工作；恒温关闭时，热泵先关闭，循环泵稍后关闭。

8.3、在恒温功能启动时，系统根据水温和设定温度启动或停止热泵的工作，对水温进行自动控制：

8.4、温度控制规律（系统开机状态下）如下：

若水温≥设定温度+1℃，则启动热泵的制冷功能；

若水温≤设定温度-1℃，则启动热泵的制热功能；

若水温=设定温度，则停止热泵工作。

三、系统故障表格

故障代码	故障信息	处理方法
F10	控制面板与控制主机无通讯	请检查控制面板和控制主机之间的连接线，必要时更换。
F11	控制主机与热泵无通讯	请检查控制主机和热泵之间的连接线，必要时更换。或者请检查热泵是否已供电。

Heat Pump ER03: Water flow failure

Water flow failure

Cause:
1. The water flow switch fault
2. Low water flow
3. The inlet and outlet water are reversed
4. There is air in the pipe
5. The pipe blocked

Action:
1. Check the water flow switch and replace it if it is faulty
2. Check the water valve and the temperature difference between inlet and outlet water
3. Whether the inlet and outlet water pipes are correctly connected
4. Emptying water system
5. Pipe cleaning

Heat Pump ER04: Winter anti-freezing

Winter anti-freezing

Cause:
The ambient temperature is lower than the antifreeze setting value
Action:
Normal protection procedure

Heat Pump ER09: Communication with the upper computer failed

Communication with the upper computer failed (Communication with Balboa system failed)

Cause:
Action:
1. Replace the main board
2. Check the communication cables between the main board and Balboa system
3. Check whether the Balboa system software matches

Heat Pump ER05: High pressure protection

High pressure protection

Cause:
1. Low water flow
2. Pressure switch fault
3. The fan motor unwork or the speed too low
4. Overcharged the refrigerant

Action:
1. Check whether the temperature difference between inlet and outlet water is too large, and whether the outlet water temperature is too high
2. Use a multimeter to check whether the high voltage protection switch works
3. Check the water flow of the water pump and the speed of the fan
4. Refill the refrigerant

Heat Pump ER06:

Low Pressure Failure

Cause:

Action:

Heat Pump ER10: Communication fault of frequency conversion module

Communication fault of frequency conversion module (alarm when communication is disconnected between external board and drive board)

Cause:
1. The mainboard or driver board damaged
2. The connector of the communication cable between the mainboard and the driver board is in poor contact or falls off
3. The communication cable is damaged

Action:
1. Replace the main board or driver board
2. Check the communication cables between the main board and driver board
3. Replace the communication cable

Heat Pump ER12: Exhaust too high protection

Exhaust too high protection

Cause:
1. Less refrigerant or leakage
2. The system blocked
3. Compressor refrigerant oil is insufficient
4. The resistance value of the exhaust probe is offset, and the inlet temperature probe is dropped

Action:
1. Refill the refrigerant
2. Replace the filter
3. Add refrigerant oil to the compressor
4. Replace the exhaust probe and reconnect the water inlet temperature probe

Heat Pump ER15: Inlet water temp. Error

Inlet water temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the water inlet temperature sensor (T2 sensor)

Heat Pump ER16: Outer coil pipe temp. Error

Outer coil pipe temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the coil pipe temperature sensor(T3)

Heat Pump ER18: Exhaust gas temp. Error

Exhaust gas temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the exhaust gas temperature sensor(T1)

Heat Pump ER19:

DC Fan Motor Failure
Cause:
Action:

Heat Pump ER20: Abnormal protection of frequency conversion module

Abnormal protection of frequency conversion module
Cause:
IPM module internal fault, check related problems according to the attached table
Action:

Heat Pump ER21: Ambient temp. Error

Ambient temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the ambient temperature sensor(T4)

Heat Pump ER23:

Cooling outlet water temperature low protection
Cause:
Action:

Heat Pump ER27:
Outlet temperature fault

Outlet temperature fault
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the water outlet temperature sensor(T6)

Heat Pump ER29:
Return gas temp. Error

Return gas temp. Error
Cause:
The sensor plug is in poor contact or off, or the sensor is damaged
Action:
Check and replace the suction gas sensor(T5)

Heat Pump ER32:
Heating outlet water high temperature protection

Heating outlet water high temperature protection
Cause:
Action:

Heat Pump ER33:
Outer Door Coil High Temperature Protection

Outer Door Coil High Temperature Protection
Cause:
Action:

Heat Pump ER35:
Compressor Current Protection

Compressor Current Protection
Cause:
Action:

Heat Pump ER42:
Internal Coil Temperature Failure

Internal Coil Temperature Failure
Cause:
Action:

Heat Pump ER44:
Ambient Temperature Too Low Protection

Ambient Temperature Too Low Protection
Cause:
Action:

Heat Pump ER46:
DC Fan Error

DC Fan Error
Cause:
1.Dc fan failure
2.Plug is in poor contact or off
Action:
1. Replace the DC fan
2. Reconnect cables to the DC fan

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Depending on the system configuration, some of the content mentioned in this manual may not appear on your system.