DC Inverter Air to Water Heat Pump

ULTIMA (R290)

Outdoor units:

HLT6MONO-S
HLT9MONO-S
HLT12MONO-S
HLT16MONO-3S
HLT40MONO-3

Error List – Analysis and Troubleshooting

Before operating this product, please read the instructions carefully and keep this manual for future use.

Catalogue

Error code

Code	Error		Analysis and Troubleshooting
F01	Outdoor ambient temp. sensor failure	Principle	When the outdoor main PCB detects a short circuit or disconnection of the ambient tempe. sensor port, the unit reports a fault and shuts down;
		Description	Accessories and tools: temp. sensor, outdoor main PCB, multimeter 1.1. Poor connect: find the connector of the ambient temp. sensor according to the wiring diagram, then check whether the sensor terminal and outdoor main PCB terminal have poor connect, pull the sensor out again and install it back in after checking, if the fault code is cleared, then pull the sensor lead towards the electrical box to ensure that there is no pulling influence between the sensor terminal and the PCB terminal. If the fault is not cleared,check according to steps as below. 1.2. Sensor fault: pull out the sensor from the outdoor main PCB, then measure the resistance value of the sensor by multimeter. If there is no resistance value or the resistance value is infinite, it means that the sensor is damaged. Therefore, the sensor should be replaced. 1.3. Outdoor main PCB fault: pull the sensor out of the outdoor main PCB and re-wire a spare sensor, then observe whether the fault on the control panel is cleared. If the fault is not cleared, it means that the outdoor main PCB is damaged and the outdoor main PCB should be replaced . 2. Change the wiring of the sensor in PCB's ports: trade the wiring of the ambient temp. sensor and outdoor coil temp. sensor (or other sensors except the discharge temp. sensor) , and check whether the ambient temp. displayed on the controller is normal. If yes, then it can be confirmed that the sensor contact is poor. If the fault is still F01, then the outdoor main PCB may be faulty (need to replace it). If the fault becomes other sensor failure, it can be confirmed that the ambient temp. se nsor is faulty (need to replace this faulty sensor). Note: after troubleshooting by this method, the sensor must be restored to its original position.
F02	Outdoor coil temp. sensor failure	Principle	When the outdoor main PCB detects a short circuit or disconnection of the outdoor coil temp. sensor port, the unit reports a fault and shuts down;
		Description	Accessories and tools: temp. sensor, outdoor main PCB, multimeter 1.1. Poor connect: find the connector of the outdoor coil temp. sensor according to the wiring diagram, then check whether the sensor terminal and the outdoor main PCB terminal have poor connect, pull the sensor out again and install it back in after checking, if the fault code is cleared, then pull the sensor lead towards the electrical box to ensure that there is no pulling influence between the sensor terminal and the PCB terminal; if the fault is not cleared,check according to steps as below. 1.2. Sensor fault: pull out the sensor from the outdoor main PCB, then measure the resistance value of the sensor by multimeter. If there is no resistance value or the resistance value is infinite,it means that the sensor is damaged. Therefore, the sensor should be replaced; 1.3. Outdoor main PCB fault: pull the sensor out of the outdoor main PCB and re-wire a spare sensor, then observe whether the fault on the controller is cleared. If the fault is not cleared, it means that the outdoor main PCB is damaged and the outdoor main PCB should be replaced according to the. 2. Change the wiring of the sensor in PCB's ports: trade the wiring of the ambient temp. sensor and outdoor coil temp. sensor(or other sensors except the discharge temp. sensor) , and check whether the outdoor coil temp. displayed on the controller is normal. If yes, then it can be confirmed that the sensor contact is poor. If the fault is still F02, then the outdoor main PCB may be faulty (need to replace it). If the fault becomes other sensor failure, it can be confirmed that the outdoor coil temp. sensor is faulty (need to replace this faulty sensor). Note: after troubleshooting by this method, the sensor plug must be restored to its original position;
F03	Compressor discharge temp. sensor failure	Principle	When the outdoor main PCB detects a short circuit of the discharge temp. sensor or after compressor switching on 10min, detect a broken of discharge temp. sensor, the unit reports a fault and shuts down;
		Description	Accessories and tools: temp. sensor, outdoor main PCB, Multimeter 1.Sensor fault: pull out the sensor from the outdoor main PCB, then measure the resistance value of the sensor by multimeter. If there is no resistance value or the resistance value is infinite,it means that the sensor is damaged. Therefore, the sensor should be replaced. 2.Poor connect: find the connector of the discharge temp. sensor accodring to the wiring diagram, then check whether the sensor terminal and the outdoor main PCB terminal have poor connect, pull the sensor out again and install it back in after checking, if the fault code is cleared, then pull the sensor lead towards the electrical box to ensure that there is no pulling influence between the sensor terminal and the main PCB terminal; Then turn on the unit and count the 10mins running time. During the operation of the unit, check whether the display of the discharge tempe. on the system diagram of the controller is normal or not. If the discharge temp. can rise normally and is higher than the water outlet temp., then the problem of the poor contact is solved. if the discharge temp. has been below 0℃f or 10 minutes, then it is necessary to check according to step 3. 3.Outdoor main PCB fault: pull out the sensor from the outdoor main PCB and re-wire a spare sensor (50K), if the ambient temp. is less than 0℃ at this time, please hold the spare sensor in hand until the temp. is raised to more than 30℃. Then observe whether the diacharge temp. displayed on the system diagram of the controller is higher than 0℃. if so, it means that there is no problem with the outdoor main PCB. if not, it means that the outdoor main PCB is damaged and should be replaced. 4. Loosening or falling off of the sensor probe: replacing the discharge temp. sensor, disassemble the unit and check whether the discharge temp. sensor is loose from the sensor install pipe and falls off, if so, retighten it;

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F04	Compressor suction temperature sensor failure	Principle	When the outdoor main PCB detects a short circuit or disconnection of the suction tempe. sensor port, the unit reports a fault and shuts down;
		Description	Accessories and tools:temp. sensor, outdoor main PCB, Multimeter 1.1. Poor connect: find the connector of the suction temp. sensor according to the wiring diagram, then check whether the sensor terminal and PCB terminal have poor connect, pull the sensor out again and install it back in after checking, if the fault code is cleared, then pull the sensor lead towards the electrical box to ensure that there is no pulling influence between the sensor terminal and the PCB terminal; if the fault is not cleared,check according to steps as below. 1.2. Sensor fault: pull out the sensor from the outdoor main PCB, then measure the resistance value of the sensor by multi meter. If there is no resistance value or the resistance value is infinite, it means that the sensor is damaged. Therefore, the sensor should be replaced; 1.3. outdoor main PCB fault: pull the sensor out of the outdoor main PCB and re-wire a spare sensor, then observe whether the fault on the controller is cleared. If the fault is not cleared, it means that outdoor main PCB is damaged and should be replaced. 2. Change the wiring of the sensor in PCB's ports: trade the wiring of the ambient temp. sensor and suction temp. sensor (or other sensors except the discharge temp. sensor) , and check whether the suction temp. displayed on the controller is normal. If so, then it can be confirmed that the sensor contact is poor. If the fault code is still display F04, then outdoor main PCB may be faulty (need to replace it). If the fault becomes other sensor failure, it can be confirmed that the suction temp. sensor is faulty (need to replace this faulty sensor), Note: after troubleshooting by this method, the sensor plug must be restored to its original position;
F05	Low pressure sensor failure	Principle	When the outdoor main PCB detects that the low pressure sensor is disconnected, the unit reports a fault and shuts down;
		Description	Accessories and tools: temp. sensor, outdoor main PCB, Multimeter 1. If the unit reports the fault codes both of F05 and F06 at the same time, measure the voltage of presssor sensor port by multimeter(DC gear, in the case of normal connection between the sensor and the outdoor main PCB), and measure the voltage between GND and +5V. if the m easure voltage is 0 or less than 4V, it means that the outdoor main PCB is damaged and should be replaced. 2. When the unit is in standby, if the Δpressure value b etween l ow pr essur e and high pre ssure show s more than 10%, then can be checked according to steps 3.1,3.2 or 4; If there is no obvious difference between the display of low pressure value and high pressure v alue, startup the unit and observe its running. If the low pressure drops to 0 bar quickly (within 90 seconds) after the compressor is started, then refer to the troubleshooting of EEV. If only report the fault code of F05, there are two ways to troubleshoot the fault as below. 3.1 Poor connect: find the connector of the low pressure sensor accodring to the wiring diagram, then check whether the sensor terminal and the outdoor main PCB terminal have poor connect, pull the sensor out again and install it back in after checking, if the fault code is cleared, then pull the sensor lead towards the electrical box to ensure that there is no pulling influence between the sensor terminal and the PCB terminal. If the fault is not cleared,check according to step 3.2. 3.2. Sensor or connecting line fault: in the case of the unit is powered on but not switched on, measure the voltage of pressor sensor port by multimeter (DC gear, in the case that sensor and PCB is connected normally) ,and measure the voltage between GND and PS, if there is no PS voltage, either the sensor or the sensor connecting line is damaged. Therefore,please replace the sensor connecting line firstly. If the fault code is not cleared after the replacement, the sensor also need to be replaced. 4. Outdoor main PCB problem: pull the pressure sensor out of the outdoor main PCB and re-wire a spare pressure sensor (no need to install in the pipe), observe whether the fault code on the controller are cleared or not. If the fault is not cleared, it means that the outdoor main PCB is damaged and need to be replaced.
F06	High pressure sensor failure	Principle	When the outdoor main PCB detects that the high pressure sensor is disconnected, the unit reports a fault and shuts down;
		Description	Accessories and tools: temp. sensor, outdoor main PCB, Multimeter 1. If the unit reports the fault codes both of F05 and F06 at the same time, measure the voltage of presssor sensor port by multimeter(DC gear, in the case of normal connection between the sensor and the outdoor main PCB), and measure the voltage between GND and +5V. if the measure voltage is 0 or less than 4V, it means that the outdoor main PCB is damaged and should be replaced. 2. When the unit is in standby, if the Δpressure value between low pressure and high pressure shows more than 10%, then can be checked according to steps 3.1,3.2 or 4; If there is no obvious difference between the display of low pressure value and high pressure value, startup the unit and observe its running. If the low pressure drops to 0 bar quickly (within 90 seconds) after the compressor is started, then refer to the troubleshooting of EEV. If only report the fault code of F06, there are two ways to troubleshoot the fault as below. 3.1 Poor connect: find the connector of the high pressure sensor accodring to the wiring diagram, then check whether the sensor terminal and the outdoor main PCB terminal have poor connect, pull the sensor out again and install it back in after checking, if the fault code is cleared, then pull the sensor lead towards the electrical box to ensure that there is no pulling influence between the sensor terminal and the PCB terminal. If the fault is not cleared,check according to step 3.2. 3.2. Sensor or connecting line fault: in the case of the unit is powered on but not switched on, measure the voltage of pressor sensor port by multimeter (DC gear, in the case that sensor and PCB is connected normally) ,and measure the voltage between GND and PS, if there is no PS voltage, either the sensor or the sensor connecting line is damaged. Therefore,please replace the sensor connecting line firstly. If the fault code is not cleared after the replacement, the sensor also need to be replaced. 4. Outdoor main PCB problem: pull the pressure sensor out of the outdoor main PCB and re-wire a spare pressure sensor (no need to install in the pipe), observe whether the fault code on the controller are cleared or not. If the fault is not cleared, it means that the outdoor main PCB is damaged and need to be replaced.

Error code

Code	Error		Analysis and Troubleshooting
F07	High pressure switch failure	Principle	When the unit has 3 consecutive high pressure switch protections (P05) within 30 minutes, F07 will be reported and the unit will shut down, and the unit cannot be startup unless re-power.
		Description	Accessories and tools: temp. sensor, outdoor main PCB, Multimeter 1. When the unit is in standby, if the Δ pressure value between the low pressure and the high pressure shows more than 10% in control panel, then measure the gas pressure by pressure gauge (connect the compressor discharge side via high-pressure needle valve, if there are no high-pressure needle valve, connect to the low-pressure needle valve), if there have obvious deviation between the high-pressure sensor detection value and gauge's measurement value, the high pressure sensor need to be replaced. 2. If there is no obvious difference between the value of the low pressure and high pressure, replace the high pressure switch. Note: Replace the high-pressure switch, set the maximum water temperature that the system is allowed to run the unit. Then observe the change of high pressure value during the operation, and observe whether there is still report F08 because of the high pressure protection not timely, and check whether the refrigerant system and the hydro system is abnormal;
F08	Low pressure switch failure	Principle	When the unit has 3 consecutive Low pressure switch protections (P13) within 30 minutes, F08 will be reported and the unit will shut down, and the unit cannot be startup unless re-power.
		Description	For troubleshooting methods, refer to P13.
F09	DC fan motor A failure	Principle	The unit with only one fan (Capacity ≤12kW): If the fan motor startup failed when the outdoor main PCB send fan's running command, the unit will report DC fan A failure, then the unit will shutdown. The unit with 2 fan (Capaciy ≥ 15kW): If the fan motor startup failed when the outdoor main PCB send fan's running command, the unit will report DC fan A failure, then the unit will keep running but compressor frequency will be limited.
F10	DC fan motor B failure	Description	Replacement parts and tools: spare fan motor, outdoor main PCB, Multimer Only one fan unit: 1. Confirm that the fan blade are not jammed by something. 2. Power off the unit, then confirm that the fan blade can turn or not, if not, replace the fan motor. 3. Power off the unit, check whether the terminal are loose or poor contact on the PCB or transfer joint, pull out the terminal out and install it back in again. 4. Power on and startup the unit, measure the voltage supplied to the DC fan port via multimeter (DC voltage) 4.1. Check the voltage between Vcc and GND is 15VDC or not, if the measure value is bigger than 18VDC, replace the outdoor PCD and fan motor. 4.2. If the voltage of VCC is normal, wire the spare fan motor with outdoor main PCB, and standup the heat pump to check whether the motor can run normally, if normal, power off the unit and install the motor; if abnormal, replace the outdoor main PCB. Two-fan unit: 1. Check base on the same 4 steps as above. 2. If one of the two fan is running normally, power off the unit, and wire the two fan ports inversely (fan motor A connect fan B port, fan motor B connect fan A port), then re-power and startup the unit, observe the fan's operation. If the failed fan is still failure, replace its motor. If the otherwise normal fan is not running, replace the fan motor driver PCB. 3. If both two fans do not run, check the voltage of VCC is normal by step 4.1, remove the two failed motor and wire the spare motor to fan A port of the fan motor driver PCB, power on and startup the unit, observe whether the motor can run normally; then power off again, and wire the spare motor to fan B port,re-power and startup the unit, observe whether the motor can run normally. If the spare motor does not operate on either port, replace the fan motor driver PCB. If the spare motor operate normally on both ports, re-install the fan motor A, and startup the unit, if the fan A does not operate, fan motor A is damaged; Then remove the fan motor A, and re-install the fan motor B, startup the unit, if the fan B does not operate, fan motor B is damaged, the damaged fan motor should be replaced.
F11	Low pressure failure	Principle	Low pressure protection happens three times within 30min for P18. Unit stops and failure can only be cleared by repowering.
		Description	Accessories and tools: refrigerant, leakage detector, pressure gauge, vacuum pump, USB disk 1. When unit is off, read refrigerant pressure value from display (unit should stay standby >30min) for first judgement if serious leakage happens. If saturation temperature corresponding to the displayed refrigerant pressure is at same level of ambient temperature, it is fine. If it is lower than ambient temperature for more than 5℃, leakage could happen. 2. For split units, check whether the refrigerant piping exceeds 15 meters and the refrigerant has not been replenished; if so, replenish the refrigerant according to the length of the piping; 3. Start the unit and observe the change of low pressure. If the low pressure is too low (i.e., the evaporating temperature is lower than the ambient temperature by more than 10℃) , and the running time is more than 5 minutes, it can be preliminarily judged as a potential leakage. Fill about 100 to 200g to see whether the low pressure of the system is increased. If yes, proceed leakage test on the system. After finding out leakage point and fixing it, vacuum the heat pump system. Then recharge the unit with correct amount of refrigerant based on info from nameplate.

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Code	Error		Analysis and Troubleshooting
F12	High pressure failure	Principle	High pressure protection (P06) happens three times within 30min. Unit stops and failure can only be cleared by repowering.
		Description	Accessories and tools: descaling equipment, USB disk Note: On the display, check data records of the last three reports of high pressure protection in the failure history. Confirm the temperature difference between the inlet and outlet water temperature and the outlet water temperature value at the time of failure happened. Then restart the unit by powering to have it run again, and make the following judgments during the operation process: 1.High pressure too high problem in heating mode: 1.1.Insufficient water flow: Check whether the temperature difference between the inlet and outlet water temperature of the unit is between 3 and 5℃. If it is far more than 5℃ (e.g., more than 8℃) and the system operated normally before, check the filters in the water system to see if there is any dirty blockage and clean them. If it is a newly-installed system, check whether the pump is set to run at low speed, and try to run the pump at a medium or high speed to ensure that the water flow is in a normal range. Ensure that system is done with air purge properly. Check whether the water pressure of the system is far below 2.0 bar and whether there is any abnormality in the water system that leads to excessive water resistance of the system; 1.2.Sensor reading deviation: Check the temperature difference between the unit's water outlet temperature and the TC temperature or TW temperature. Under normal circumstances, the water outlet temperature will be 3 to 5℃ higher than the TC or TW. If it exceeds 5℃, please check whether the TC and TW sensors are not well in position or the installation position is not suitable. TC or TW should be installed in the upper part of the tank; 1.3.Heat exchanger scaling: In the process of unit operation, observe whether the temperature of the indoor coil is more than 5℃ higher than the water outlet temperature. If so, there can be scaling in the plate exchange, cleaning will be needed to remove the scale; 2.Cooling mode with high pressure problem: Check whether the evaporator of the outdoor unit is dirty and blocked or there is poor heat dissipation around the external unit. If so, consider adding a wind guide ring to the unit, so that the hot air can be discharged in a timely manner; 3.If the above solution fails to solve the problem, the EEV of the refrigerant system may be abnormal. Please refer to "EEV troubleshooting section".
F13	Room temp. sensor failure	Principle	When the line controller is set to room temperature control mode or the room temperature curve fine-tuning function is active, and the room temperature sensor is detected to be disco nnected or shorted, the unit will report a fault and be shut down;
		Description	Accessories and tools: sensors. main PCB. multimeter 1.Poor contact: Based on unit wiring diagram, find the connection of the temperature sensor. Check contact between sensor terminals and PCB terminals if it is poor. If yes, pull the sensor out and plug it back in. If the fault is cleared, pull the sensor leads toward the electrical box to ensure that there is no tension between the sensor terminals and PCB terminals. If the fault is not cleared, then check according to point 2; 2.Main PCB problem: Pull the sensor out from main PCB and reinsert a new sensor to see whether the failure on display is cleared or not. If the fault is not cleared, it means that the main PCB is damaged. Please replace the main PCB. If it is cleared, first test the intermediate connecting wire whether there is a short circuit or a broken circuit. If yes, replace the intermediate connecting wire. If no, replace the room temperature sensor;
F14	Hot water temp. sensor failure	Principle	When the hot water mode is active, if a disconnected or shorted hot water temperature sensor is detected, the unit will report a fault and be shut down;
		Description	Accessories and tools: sensors. main PCB. multimeter 1.Poor contact: Based on unit wiring diagram, find the connection of the temperature se nsor. Check contact between sensor terminals and PCB terminals if it is poor. If yes, pull the sensor out and plug it back in. If the fault is cleared, pull the sensor leads toward the electrical box to ensure that there is no tension between the sensor terminals and PCB terminals. If the fault is not cleared, then check according to point 2; 2.Main PCB problem: Pull the sensor out from main PCB and reinsert a new sensor to see whether the failure on display is cleared or not. If the fault is not cleared, it means that the main PCB is damaged. Please replace the main PCB. If it is cleared, first test the intermediate connecting wire whether there is a short circuit or a broken circuit. If yes, replace the intermediate connecting wire. If no, replace the room temperature sensor;

Error code

Code	Error		Analysis and Troubleshooting
F15	TC (heating/cooling) water temp. sensor failure	Principle	When heating/cooling mode is active, if a disconnected or shorted TC sensor is detected, the unit will report a fault and be shut down;
		Description	Accessories and tools: sensors. main PCB. multimeter 1.Poor contact: Based on unit wiring diagram, find the connection of the temperature sensor. Check contact between sensor terminals and PCB terminals if it is poor. If yes, pull the sensor out and plug it back in. If the fault is cleared, pull the sensor leads toward the electrical box to ensure that there is no tension between the sensor terminals and PCB terminals. If the fault is not cleared, then check according to point 2; 2.Main PCB problem: Pull the sensor out from main PCB and reinsert a new sensor to see whether the failure on display is cleared or not. If the fault is not cleared, it means that the main PCB is damaged. Please replace the main PCB. If it is cleared, first test the intermediate connecting wire whether there is a short circuit or a broken circuit. If yes, replace the connecting wire. If no, replace the TC temperature sensor;
F16	Water outlet temp. sensor failure	Principle	When display detects that the water outlet temperature sensor is disconnected or shorted, it will report a failure but unit will not be shut down. Unit keeps working with water inlet temperature + stop ΔT as target temperature. If both the water inlet and outlet water temperature fails, it will be shut down;
		Description	Accessories and tools: sensors. main PCB. multimeter Note: For split unit, indoor control PCB and water outlet temperature sensor are in indoor unit For monoblock unit, indoor control PCB is in indoor unit and water outlet temperature sensor is in outdoor unit. 1.Poor contact: Based on unit wiring diagram, find the connection of the temperature sensor. Check contact between sensor terminals and PCB terminals if it is poor. If yes, pull the sensor out and plug it back in. If the fault is cleared, pull the sensor leads toward the electrical box to ensure that there is no tension between the sensor terminals and PCB terminals. If the fault is not cleared, then check according to point 2; 2.Main PCB problem: Pull the sensor out from main PCB and reinsert a new sensor to see whether the failure on display is cleared or not. If the fault is not cleared, it means that the main PCB is damaged. Please replace the main PCB. If it is cleared, then check according to point 3; 3.Sensor problem: 3.1. For split unit, pull sensor out from control PCB and use multimeter to detect resistance of sensor. If the resistance value is infinite or no resistance value, then replace the sensor. 3.2. For monoblock unit, check according to 3.1. While for unit with an intermediate connection cable (and the indoor panel is not inside the outside unit), the status of the intermediate connection cable should also be checked;
F17	Water inlet temp. sensor failure	Principle	When display detects that the water inlet temperature sensor is disconnected or shorted, it will report a failure but unit will not be shut down. Unit keeps working with water inlet temperauter + stop ΔT as target temperature. If both the water inlet and outlet water temperature fails, it will be shut down;
		Description	Accessories and tools: sensors, main PCB, multimeter Note: For split unit, indoor main PCB and water outlet temperature sensor are in indoor unit. For monoblock unit, indoor main PCB is in indoor unit and water outlet temperature sensor is in outdoor unit. 1.Poor contact: Based on unit wiring diagram, find the connection of the temperature sensor. Check contact between sensor terminals and PCB terminals if it is poor. If yes, pull the sensor out and plug it back in. If the fault is cleared, pull the sensor leads toward the electrical box to ensure that there is no tension between the sensor terminals and PCB terminals. If the fault is not cleared, then check according to point 2; 2.Main PCB problem: Pull the sensor out from main PCB and reinsert a new sensor to see whether the failure on display is cleared or not. If the fault is not cleared, it means that the main PCB is damaged. Please replace the main PCB. If it is cleared, then check according to point 3; 3.1. Sensor problem:For split unit, pull sensor out from main PCB and use multimeter to detect resistance of sensor. If the resistance value is infinite or no resistance value, then replace the sensor. 3.2. For monoblock unit, check according to 3.1. While for unit with an intermediate connection cable (and the indoor panel is not inside the outside unit), the status of the intermediate connection cable should also be checked;

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F18	Indoor coil temp. sensor failure	Principle	When cooling mode is active, if the indoor coil temperature sensor is detected to be disconnected or shorted, the unit will report a fault and be shut down. When heating mode or hot water mode is active, failure remains but unit will continue to run for heating or hot water;
		Description	Accessories and tools: sensors. main PCB. multimeter Note: For split unit, indoor main PCB and water outlet temperature sensor are in indoor unit. For monoblock unit, indoor main PCB is in indoor unit and water outlet temperature sensor is in outdoor unit. 1.Poor contact: Based on unit wiring diagram, find the connection of the temperature sensor. Check contact between sensor terminals and PCB terminals if it is poor. If yes, pull the sensor out and plug it back in. If the fault is cleared, pull the sensor leads toward the electrical box to ensure that there is no tension between the sensor terminals and PCB terminals. If the fault is not cleared, then check according to point 2; 2.Main PCB problem: Pull the sensor out from main PCB and reinsert a new sensor to see whether the failure on display is cleared or not. If the fault is not cleared, it means that the main PCB is damaged. Please replace the main PCB. If it is cleared, then check according to point 3; 3.Sensor problem: 3.1.For split unit, pull sensor out from main PCB and use multimeter to detect resistance of sensor. If the resistance value is infinite or no resistance value, then replace the sensor. 3.2. For monoblock unit, check according to 3.1. While for unit with an intermediate connection cable (and the indoor panel is not inside the outside unit), the status of the intermediate connection cable should also be checked;
F19	Water flow sensor failure	Principle	When the water flow sensor is installed on the outdoor main PCB, if there is no feedback signal is detected from the water flow sensor, it means the water flow sensor is failure, the unit will report a fault and be shut down.
		Description	Accessories and special tools: water flow sensor, main PCB, multimeter 1.Check whether the water flow sensor connectingcable of the outdoor unit is loose or disconnected, find out the water flow sensor terminal according to the wiring diagram, pull it out and then plug it back in again, if the failure can't be cleared, carry to step 2. 2.When the P0 water pump is running, use a multimeter (DC voltage gear), test the voltage of the water flow port, whether the voltage between GND port and 12V port is 12V, and whether the voltage between GND port and PS3 port is ＞0. If the voltage is ＞0, replace the outdoor main PCB, if the voltage is =0, replace the water flow sensor; 3.When the pump is running, check if the the value of water flow is close to or less than the minimum allowable flow rate of the unit.If so,refer to failure code S02: water flow switch protection, to find out the reason of insufficient of water flow in the system and then solve the problem.
F20	Refrigerant leakage protection	Principle	When equipped with refrigerant leakage detection function, if refrigerant leakage is detected, after 3 times reported the P16 , F20 will then be reported, at this time, the unit will be locked up and cannot be recovered until repower;
		Description	Accessories and tools: refrigerant leakage detector, main PCB, multimeter, USB disk 1.When unit is in Off state, check the refrigerant press ure valu e in s tandb y state throug h operatio n panel(standby time should more than 30 minutes),to confirm whether there is a serious leakage of refrigerant firs.The judgment: whether the saturation tempera ture that c orrespo nding to the c urre nt displayed refrigerant pressure value is the same as the ambient temperature, and if the refrigerant pressure value is lower than the ambient temperatur e by more tha n 5℃, then can ju dge t hat th ere is a leakage of refrigerant basically; 2.Check whether the refrigerant system have leakage problem, use refrigerant leakage detector, check inside the compressor cabinet, check if the refrigerant detection box have leakage alarming, if so, can double check where the leakage point is, if not, carry out the check in step 3; 3. Replace the refrigerant detector(sensor), and then repower the unit, to analyze the way according to step 4; 4. Observe the change of low pressure, if the low pressure is too low (i.e. the evaporating temperature is lower than the ambient temperature by more than 10°C) , and the operation time of the unit is more than 5 minutes, it can judge there is a leakage point. Can temporarily supplemented with 100-200g refrigerant to see if the low pressure will have rebound, if so, re-vacuum the unit and re-inject the refrigerant according to the refrigerant amount on the nameplate;

Error code

Code	Error		Analysis and Troubleshooting
F21	3-way valve mixing temp. sensor 1 failure	Principle	When the mixing valve function is valid, if the mixing water temperature sensor 1 is detected to be disconnected or short circuit, F21 is reported, but the unit does not stop.
		Description	Accessories and tools: sensor, main PCB, multimeter 1.Poor contact: find the interface of the temperature sensor according to the wiring diagram , check if the sensor terminals and PCB terminals is poor contact, pull it out and then plug it back in again, if the failure is cleared, then pull longer the sensor toward the electrical box to ensure here is no tension between the sensor terminals and PCB terminals; if the failure is not cleared, then check according to step 2; 2.Main PCB problem: pull the sensor out of the circuit PCB and plug in a temporary sensor, observe whether the failure on the operation panel is cleared or not, if the failure is not cleared, it means that the main PCB is damaged, replace the main PCB ; if the failure is cleared, first check if the intermediate connecting wire is in short circuit or in broken circuit, if there is, replace the intermediate connecting wire, if there is not, replace the room temperature sensor;
F22	3-way valve mixing temp. sensor 2 failure	Principle	When the mixing valve function is valid, if the mixing temperature sensor 2 is detected to be disconnected or short circuit, F21 is reported, but the unit does not stop.
		Description	Accessories and tools: sensor. main PCB. Multimeter 1.Poor contact: find the interface of the temperature sensor according to the wiring diagram , check if the sensor terminals and PCB terminals is poor contact, pull it out and then plug it back in agaian, if the faliure is cleared, then pull longer the sensor tow ard the electrical box to ensure here is no tension between the sensor terminals and PCB terminals; if the failure is not cleared, then check according to step 2; 2.Main PCB problem: pull the sensor out of the circuitl PCB and plug in a temporary sensor, observe whether the failure on the operation panel is cleared or not, if the failure is not cleared, it means that the main PCB is damaged, replace the main PCB ; if the failure is cleared, first check if the intermediate connecting wire is in short circuit or in broken circuit, if there is, replace the intermediate connecting wire, if there is not, replace the room temperature sensor;
F23	Reserved		
F24	Reserved		
F25	Reserved		
F26	Reserved		
F27	Indoor EEPROM failure	Principle	When the EEPROM data of the indoor main PCB cannot be read, F27 is reported and the unit is shut down.
		Description	Accessories and tools: indoor main PCB Replace the indoor PCB;
F28	Water pump PWM signal failure	Principle	When the P0 water pump is set to be controlled by PWM pump, if without feedback signal is detected after the water pump runs for 120 seconds, F28 is reported and the unit is shut down.
		Description	Accessories and tools: water pump.main PCB. multimeter Check whether the water pump PWM signal cable is loose or poor contact, when unit is in Off state, pull it out and then plug it back in again, and then repowered and run the unit, observe whether the failure is cleared after the water pump runs for 2 minutes. At the same time, within 2 minutes, use DC voltage gear of the multimeter to measure if the the feedback voltage of the water pump PWM terminal on the indoor main PCB is ＞0V, if so, replace the indoor main PCB, if not, replace the PWM signal cable, if still cannot clear the failure, replace the water pump;

Error code

Code	Error		Analysis and Troubleshooting
F29	Mixing valve 1 failure	Principle	When the mixing valve function is valid, in the heating mode, the mixing water temperature 1-set temperature is in system 1 > 4℃; or in the cooling mode, the mixing water temperature 1-set temperature in system 1 < 4℃, and the mixing va lve is adjust ed to 0V an d keep f or 10 minutes, then 3-way valve 1 failure is reported, the secondary water pump is shut down, but the heat pump will keep operating.
		Description	Accessories and tools: mixing valve, main PCB, Multimeter 1.Check whether the actual TC temperature for heating is lower than the mixing water temperature in the water system diagram of the operation panel, if so, check the installation position of the mixing water temperature sensor; or check if the floor of the room is exposed to direct sunlight so resulting in a high mixing water temperature, if so, can ignore this failure, because when there is no direct sunlight exposed, after the mixing water temperature drops the failure will be cleared automatically; 2.Check whether the actual TC temperature for heating is higher than the mixing water temperature in the water system diagram of the operation panel, if so, keeping checking as following: 2.1. According to the wiring diagram, use a multimeter (DC voltage gear) to measure whether the 24V power supply of the mixing valve is normal or not, if not normal, check whether the connecting cables between the mixing valve and the main PCB is loose or disconnected; 2.2. Power off and restart the unit, according to the wiring diagram, use a multimeter (DC voltage gear) to measure if the control signal of water mixing valve decrease from 5V down to 0V in the way about every 20 seconds decrease 0.5V, if so, hig her th e setting temperatu re of the mixing temperature (5℃ higher than the current mixing temperature). Then test if the mixing valve control signal increase in about every 20 seconds increase 0.5 V, at the s ame time , observe if t he mixing water temperature have tendency to increase, if not, either the mixing valve coil is abnormal, or the mixing valve is stuck. 3. Replace the valve coil. When unit is in Off state, replace the cables and coil. If there is an extension cable in the middle, can first check if the extension cable is poor contact: disconnect both ends of the extension cable, in one end of the cable connect 0V and 10V together, and connect 0V with 24V together, then use the on and off gear of multimeter to measure the other end of the cable between 0V and 10V, 0V and 24V to see whether it is conducting, if it is conducting, replace the valve coil, if it not conduct, replace the intermediate connecting cable first then repeat the operation in step 2.2;
F30	Mixing valve 2 failure	Principle	When the mixing valve function is valid, in the heating mode, the mixing water temperature 2-set temperature is in system 2 > 4°C; or in the cooling mode, the mixing water temperature 2-set temperature in system 2 < 4°C, and the mixing valve is adjusted to 0V adn keep for 10 minutes, then 3-way valve 2 failure is reported, the secondary water pump is shut down, but the heat pump will keep operating.
		Description	Accessories and tools: mixing valve. main PCB. multimeter 1.Check whether the actual TC temperature for heating is lower than the mixing water temperature in the water system diagram of the operation panel, if so, check the installation position of the mixing water temperature sensor; or check if the floor of the room is exposed to direct sunlight so resulting in a high mixing water temperature, if so, can ignore this failure, because when there is no direct sunlight exposed, after the mixing water temperature drops the failure will be cleared automatically; 2.Check whether the actual TC temperature for heating is higher than the mixing water temperature in the water system diagram of the operation panel, if so, keeping checking as following: 2.1. According to the wiring diagram, use a multimeter (DC voltage gear) to measure whether the 24V power supply of the mixing valve is normal or not, if not normal, check whether the connecting cables between the mixing valve and the main PCB is loose or disconnected; 2.2. Power off and restart the unit, according to the wiring diagram, use a multimeter (DC voltage gear) to measure if the control signal of water mixing valve decrease from 5V down to 0V in the way about every 20 seconds decrease 0.5V, if so, higher the setting temperature of the mixing temperature (5°C higher than the current mixing temperature). Then test if the water mixing valve control signal increase in about every 20 seconds increase 0.5V, at the same time, observe if the mixing water temperature have tendency to increase, if not, either the mixing valve coil is abnormal, or the mixing valve is stuck. 3. Replace the valve coil. When unit is in Off state, replace the cables and coil. If there is an extension cable in the middle, can first check if the extension cable is poor contact: disconnect both ends of the extension cable, in one end of the cable connect 0V and 10V together, and connect 0V with 24V together, then use the on and off gear of multimeter to measure the other end of the cable between 0V and 10V, 0V and 24V to see whether it is conducting, if it is conducting, replace the valve coil, if it not conduct, replace the intermediate connecting cable first then repeat the operation in step 2.2;
E01	Reserved		

Error code

Code	Error		Analysis and Troubleshooting
E02	Outdoor main PCB and driver PCB communication failure	Principle	When there is no communication between the outdoor main PCB and driver PCB for 30s, the outdoor main PCB will report a failure and unit will be shut down while the driver PCB will also stop working.
		Description	Accessories and tools: Outdoor main PCB, driver PCB, Communication cable, Multimeter 1.Cut the power of unit and open the outdoor unit's electrical box. According to the wiring diagram, check whether the communication cable between the outdoor main PCB and driver PCB is loose. Reinsert the communication cable and ensure that it is correctly inserted into the communication ports. 2.Restart the unit and observe if there are indicator lights blinking on the driver PCB. Use a multimeter (set to AC voltage mode) to measure the input voltage of the driver PCB (L+N for single-phase unit, L1+L2+L3 for three-phase unit) to verify its consistency with the power supply. If the power supply is normal for each phase, replace the driver PCB. 3.If the communication failure persists even after replacing the driver PCB, replace the outdoor main PCB.
E03	Compressor phase current reading failur	Principle	Hardware Damage of driver PCB Compressor Phase Current Sampling Component
		Description	Accessories and tools: driver PCB, Multimeter Replace the compressor driver PCB with a new one.
E04	Compressor phase current overload protection	Principle	When compressor is operating, if the current of the compressor is higher than the protection value of the driver, unit will report a failure and be shut shown;
		Description	Accessories and tools: driver PCB, EEPROM document, USB flash disk, Multimeter. 1.If the failure occurs on a new unit and the compressor can reach frequency above 60Hz during operation, try to update the EEPROM of outdoor main PCB to avoid problem caused by incorrect settings. 2.If the compressor is not working at all after unit is ON,the problem can be caused by defective driver PCB. Please try to replace the driver PCB. 3.If the compressor starts but shakes unusually with speed below 60Hz while this failure occurs, compressor can be defective with a locked rotor. Restart the unit and try to gently tapping the bottom of the compressor during startup. If the issue persists, replace the c ompressor (before doing so, if possible, try to replace the compressor driver PCB for check)
E05	Compressor driver failure	Principle	When the driver PCB fails to activate compressor, unit will report a failure and be shut shown.
		Description	Accessories and tools: driver PCB, Multimeter Check if the wires from the compressor driver PCB to the compressor are securely connected. If the connection is loose, fasten the cables and restart the unit. If compressor is still not functioning, unplug the wires on the compressor and measure the resistance between the different terminals of compressor (between U&V / V&W / U&W) to verify if resistance between different terminals are same or if any circuit is open: 1.If resistance values between different compressor terminals are tested almost equal, try to replace the driver PCB. If the compressor still can not start or shakes unusually after startup with speed below 60Hz while E05 failure happens, compressor can be defective with a locked rotor. Restart the unit and try to gently tapping the bottom of the compressor during startup. If the issue persists, replace the compressor. 2. If resistance values between different compressor terminals are tested unequal or there is any open circuit, compressor is damaged. Replace the compressor.

Error code

Code	Error		Analysis and Troubleshooting
E06	Driver PCB VDC too high/low voltage failure	Principle	When the driver PCB detects an excessively high or low rectified DC voltage, drive PCB will stop working and the unit will be shutdown.
		Description	Accessories and tools: drive PCB. DC fan motor. Multimeter 1.Use a multimeter to check if the voltage of the power terminal (L1/L2/L3 for three-phase models) is within normal range: 160V-260V for single-phase and 340V-420V for three-phase. 2.Power off the unit and disconnect the DC fan motor from outdoor main PCB. Repower the unit to check whether the abnormal voltage detection is caused by defective fan motor. If the failure is cleared, replace the DC fan motor. If the issue persists, replace the compressor driver PCB
E07	Input current protection (main control logic protection)	Principle	1. If input current is over 4A when compressor is not working or input current is less than 1A when compressor is running at F4 or higher step, unit will report a failure and be shut shown. 2. During the operation of the compressor, if it is detected that the input current is greater than the current protection value of the corresponding model, it will report a fault and shut down.
		Description	Accessories and tools: refrigerant, Refrigerant leak detector, Pressure gauge, Vacuum pump, Electronic scale, Main PCB, Multimeter Turn off the secondary water pump, restart the unit, and observe the changes in the current when the unit heat up the buffer water tank, focusing on the high water temperature stage. If the unit does not reduce the frequency before protection, you can try to re-brush the EEPROM; Case 1: 1.Restart the unit. After compressor starts, check if the evaporating temperature is much lower than normal range (more than 10℃ below ambient) or if the discharge temperature rises obviously higher than normal range (more than 35℃ above water temperature). If yes, it may indicate refrigerant leakage. Try to charge the system with certain amount of refrigerant and observe if it works better. 2.For split unit, check whether the refrigerant pipe is over 15 meters and additional refrigerant is charged. If not, charge refrigerant according to the length of piping. 3.Use a multimeter to test the live wire of the power input cable of the outdoor unit and check whether the running current is less than 4A when the unit is standby. If it exceeds 4A, or if running current is less than 1A when the unit starts and runs at above 50Hz, the Main PCB can be defective. Try to replace it. Case 2: 1. Turn off the secondary water pump and restart the unit. If the temperature difference between the inlet and outlet water is greater than 8°C, check whether the water pump speed is set to high speed (if it is low speed, please adjust it to medium speed or high speed). Also check the filter in the water system. whether it is blocked; 2. If it is triggered in hot water mode, you can confirm whether the coil of the domestic water tank is too small (the minimum heat exchange area is $3m^2$). If it is too small, it means that the coil of the water tank is too small, resulting in low heat exchange capacity, causing the heat pump unit to continuously accumulate heat, and eventually the water temperature rises too fast, resulting in excessive current. You can temporarily turn on the hot water ECO mode to see if the hot water ECO mode can alleviate the heat exchange problem of the water tank. If the hot water ECO mode If the problem cannot be solved, you need to replace the coil water tank with a larger coil area (at least $3m^2$); 3. During operation, observe the difference between the inner coil temperature (TUP) and the outlet water temperature. Under normal circumstances, the inner coil temperature is 1 to 2°C lower than the outlet water temperature. If the inner coil temperature is higher than the outlet water temperature, then Due to the scaling of the plate exchanger, the heat pump heat cannot be exchanged normally, causing an increase in current and causing a malfunction. The pl ate exchanger c an be des caled an d cleaned; 4. When triggered in cooling mode, you can check whether the evaporator is dirty or blocked or the installation position causes a heat island effect, resulting in a high current. You can clean the evaporator and adjust the installation position or install an exhaust duct to eliminate the heat island effect. ; 5. The electronic control parameters are set incorrectly, resulting in false alarms from the unit. At this time, you can try to upgrade the EEPROM settings of the main PCB. 6. Check whether the input voltage is normal. If it is more than 10% lower than the rated voltage, excessive current protection may be triggered. Please contact the power supplier to adjust the power supply voltage.

Error code

Code	Error		Analysis and Troubleshooting
E08	EEPROM failure	Principle	When the outdoor main PCB chip cannot read the parameters or there is a parameter verification error, unit will report a failure and be shut shown.
		Description	Accessories and tools: Outdoor main PCB, Multimeter Power off and restart, if the fault still cannot be cleared after restarting, then replace the Outdoor main PCB;
E09	Reserved		
E10	Fan drive PCB communication failure	Principle	When the outdoor main PCB detects that there is no communication with the fan driver PCB for more than 2 minutes, a fault is reported. When communication is restored, the fault is cleared;
		Description	Accessories and tools: outdoor main PCB, Fan drive PCB,multimeter 1.Wiring problem: According to the wiring diagram, check whether the A/B port of the communication line has been reversed or has poor contact. Use a multimeter (on/off gear) to test the communication line between the Fan drive PCB and the Outdoor PCB when unit is off; 2.Power supply problem: Check whether the power supply of the Fan drive PCB is normal (230VAC and the PCB has a blinking light); 3.Hardware problem: Replace with a new one;
S01	Cooling anti-freezing protection	Principle	In Cooling mode, if the evaporating temperature is detected less than 1°C after the compressor runs for 3 minutes, unit will report a failure and be shut shown;
		Description	Accessories and tools: refrigerant, Refrigerant leak detector, Pressure gauge, Vacuum pump, Electronic scale, Control PCB. Multimeter 1.Check the temperature difference between the inlet and outlet water of the unit. If it exceeds 8°C, check and clean the filter of the water system. Try to adjust the water pump speed to high-speed operation if possible. 2.Check if the outlet water temperature is 7°C or lower. If yes, check and confirm Tc sensor is installed correctly. 3.When unit is off, check the refrigerant pressure value (standby time should be more than 30 minutes) to determine if there is any refrigerant leak. Check if the saturation temperature corresponding to the current pressure value is consistent with the current ambient temperature. If it is lower than the outdoor ambient temperature by more than 5°C, there can be a refrigerant leak. 4.For split unit, check whether the refrigerant pipe is over 15 meters and additioanl refrigerant is charged. If not, charge refrigerant according to the length of piping. 5.Restart the unit and observe the changes of low-pressure value. If the corresponding refrigerant evaporating temperature falls within the range of 4-6°C, the unit will work with limited compressor speed. If the low-pressure value becomes too low (evaporating temperature below 1°C) and the running time exceeds 3 minutes, while EEV fully open in this period, there is most likely a refrigerant leak. In this case, please charge 100 to 200g of refrigerant and check if the low-pressure of the system rises. If yes, check and fix the leakage of system and then vacuum the unit and recharge the refrigerant according to the product label. 6.If the above troubleshooting are not functioning, the failure can be caused by EEV. Please refer to the "EEV troubleshooting section".

Error code

Code	Error		Analysis and Troubleshooting
S02	Water flow switch protection	Principle	When the system pump (P0) starts to run for≥20 **seconds, and the water flow switch is open ≥ 10 seconds, unit will report a failure and be shut shown;**
		Description	Accessories and tools: water flow switch, water pump, indoor PCB, multimeter. 1.Check whether system is well done with air purge, whether the water pressure is above 2 bar, whether all valves are open, and whether the filter is blocked or not. 2.Check whether the water pump is running correctly and the water flows in the correct direction after the unit is turned on. 3.Disconnect the water flow switch from the wiring and replace the water flow switch with a jumper on control PCB. Then turn the unit on. If the failure still happened, replace the indoor main PCB. 4.1 If the unit can run normally after replacing the water flow switch with a jumper on PCB, observe whether the inlet and outlet water temperature ΔT is within a reasonable range (if the compressor running below 50Hz, the inlet and outlet water temperature ΔT should not be more than 5°C; if it is above 65Hz, the inlet and outlet water temperature ΔT should not be more than 8°C. Otherwise, the water flow in the system is insufficient. In order to protect the unit, check the condition of air purging, water resistance, water pressure, etc). 4.2 If the inlet and outlet water temperature ΔT is within a reasonable range, take down the water flow switch and reinstall it after cleaning. If the problem still cannot be solved, replace the water flow switch and restart the unit.
S03	Water flow switch failure	Principle	After the system pump (P0) stops running and the water flow switch is detected to be closed for 5 minutes, unit will report a failure and be shut shown;
		Description	Accessories and tools: water flow switch, water pumps, indoor PCB. multimeter. 1.Check if the water flow switch port is closed by jumper instead of cables of flow switch. If so, restore water flow switch wiring. If not, follow point 2; 2.Water flow switch checking: When unit is off or stops, pull the water flow switch cable out from the indoor PCB and use a multimeter (on/off) to check the water flow switch. If it's open, replace the indoor PCB, if it's closed, check the water flow switch further (Close the water pipe valve outside the unit, take out the water flow switch and check whether the water flow switch is stuck or damaged. If it cannot be repaired, then replace it.) 3.External factors: Whether there is an external water pump working in the same water system. If so, the system water pump should be adjusted to synchronize it with the external water pump. (if the external water pump is running all the time);
S04	Indoor unit communication failure	Principle	Whenever there is no communication between the operation panel and the indoor main PCB for 2 minutes, unit will report a failure and be shut shown;
		Description	Accessories and tools: indoor main PCB, operation panel, multimeter 1.Confirm the situation of communication failure: If there is no communication as soon as the power is on, check according to 2.3.4; if the communication is normal after the power is on, but become abnormal after the outdoor unit starts, check whether there is a G cable with the A/B communication terminal of the outdoor unit. If yes, please connect the G line of the outdoor unit to the G port at the communication port of the indoor PCB, and then restart the unit. If the communication failure still exists, check whether the communication wire between the indoor and outdoor is separated from the strong power. 2.Wiring problem: According to the wiring diagram, check whether the A/B port of the communication line has been reversed or has poor contact. Use a multimeter (on/off gear) to test the communication line between the operation controller and the indoor PCB when unit is off; 3.Power supply problem: Check whether the power supply of the indoor PCB is normal (24VDC and the motherPCB has a blinking light); 4.Hardware problem: Replace with a new one;

Error code

Code	Error		Analysis and Troubleshooting
S05	Outdoor unit communication failure	Principle	Whenever there is no communication between the operation panel and the indoor main PCB for 2 minutes, unit will report a failure and be shut shown;
		Description	Accessories and tools: outdoor control PCB, fan motor, operation panel, multimeter 1.Confirm the situation of communication failure,if there is no communicationas soon as the power is on, check according to 2.3.4; if the communication is normal after the power is on, but become abnormal after the outdoor unit is running, then confirm whether there is a G on the A/B communication terminal of the outdoor unit, if yes, please connect the G line of the outdoor unit to the G port at the communication port of the indoor main PCB, and then restart the unit, if the communication failure still exists, check whether the communication wire in the indoor and outdoor is separated from the strong power, please contact the manufacturer. 2.Wiring problems: check whether the A/B port of the indoor and outdoor unit communication line has not been connected to the reverse or poor contact, use a multimeter (on and off gear), in the case of the unit power-off, short-circuit the A/B on one end and measure the connection on the other end, if the disconnection, then replace the communication line; 3.Power supply problem: Check whether the power supply of the outdoor PCB is normal (230VAC and the main PCB has a blinking light; 4.Disconnect the power, unplug the DC fan from the main PCB, and reapply the power to verify that the communication failure is not caused by a damaged motor. 5.Hardware problem with the operation panel itself, replace with a new one;
S06	Cooling outlet water temperature too low protection	Principle	In cooling mode, if TUO < 5°C unit will report a failure and be shut down.
		Description	1. Restart operation, before displaying S06, confirm the inlet and outlet water temperature ΔT through the system diagram on the operation panel. If it is greater than 8°C, check whether the pump speed is setting to high speed (if it is low, adjust it to medium or high speed), and also check whether the filters in the water system are clogged or not; 2.Whether the set temperature is low (whether less than 10°C),during operation, observe the difference between the TC temperature and the outlet water temperature, if the outlet water temperature is more than 2°C lower than the TC, it is recommended that the set temperature be increased to more than 12°C to ensure that the outlet water temperature won't drop too low;
S07	Heating / DHW outlet water temperature too high protection	Principle	When compressor is working in heating or hot water mode, if the outlet water temperature is detected to be higher than the maximum permissible outlet water temperature of the heat pump, unit will report a failure and be shut shown., but the electrical heater can continue to work;
		Description	In hot water mode: 1. Restart the unit, when S07 happens, check the inlet and outlet water temperature and water tank TW sensor value. If the inlet water temperature of the heat pump is higher than the TW value (normally, the TW is always higher than the inlet water temperature of the heat pump), the coil of the water tank can be too small which leads to the low heat exchanging capacity and causes S07. For temporary solution, the hot water ECO mode can be turned on to see if it is possible to alleviate the heat exchange problem of the water tank. If the problem can not be solved, it is necessary to replace the coil of water tank with a larger area as recommended; Coexistence of heating and hot water modes. 1.Observe the inlet and outlet water temperature ΔT of heat p ump, if it i s more t han 8°C, plea se check whether the speed setting of the water pump is high speed . If it is low speed, please adjust it to medium or high speed. And at the same time, please check whether the filter in the water system is clogged; 2.Check the difference between the TC temperature and the outlet water temperature. If the temperature difference is more than 5°C (the outlet water temperature is higher than the TC), check whether the TC temperature sensor is installed in the middle or upper part of the buffer tank;
S08	Defrost three-time failure	Principle	When S09 (Defrost outlet water temp. too low protection) is triggered 3 times, unit will report a failure and be shut shown. This failure can not be receovered untill repower;
		Description	1.If the ambient temperature is below 0°C and the water temperature is below 10°C, when the unit starts up and runs for the first time with defrost, water outlet temp can be too low can result in this protection. 2.Restart heating mode and observe the inlet and outle t water tempera ture ΔT d uring the heating operation. If it's more than 8°C and the set temperature is low (below 30°C), check whether the water pump speed is high speed (if it is low, please adjust to medium or high speed). Also check whether the filter is clogged in the water system. It is better to increase the set temperature to more than 32°C; 3.Check whether the unit is with heavy frost (evaporator frost thickness greater than 8mm or ice fully covers), resulting in defrost time too long which cause the water temperature too low. In this case, manually remove the frost on the evaporator with hot water, and then check the cause of serious frost; 4.If the unit is newly installed, the distribution system is floor heating and fully open, it's recommended to close 2/3 of the water pipes of the floor heating to let the heat pump raise the water temperature as soon as possible. After the water temperature goes above 30°C, then open some more water loops. Keep this cycle constantly to raise the water temperature of heat pump to medium temperature.

Error code

Code	Error		Analysis and Troubleshooting
S09	Defrost outlet water temp. too low protection	Principle	During defrost, if TUO < 15°C, unit will report a failure and stop defrosting;
		Description	1.If the ambient temperature is below 0°C and the water temperature is below 10°C, when the unit starts up and runs for the first time with defrost, water outlet temp can be too low can result in this protection. 2.Restart heating mode and observe the inlet and outlet water temperature ΔT during the heating operation. If it's more than 8°C and the set temperature is low (below 30°C), check whether the water pump speed is high speed (if it is low, please adjust to medium or high speed). Also check whether the filter is clogged in the water system. It is better to increase the set temperature to more than 32°C; 3.Check whether the unit is with heavy frost (evaporator frost thickness greater than 8mm or ice fully covers), resulting in defrost time too long which cause the water temperature too low. In this case, manually remove the frost on the evaporator with hot water, and then check the cause of serious frost; 4.If the unit is newly installed, the distribution system is floor heating and fully open, it's recommended to close 2/3 of the water pipes of the floor heating to let the heat pump raise the water temperature as soon as possible. After the water temperature goes above 30°C, then open some more water loops. Keep this cycle constantly to raise the water temperature of heat pump to medium temperature.
S10	Water flow switch failure	Principle	When the unit has 3 consecutive S02 protection within 30 minutes, S10 will be reported.
		Description	Refer to the troubleshooting of water flow switch protection (S02).
S11	Cooling anti-freeze failure	Principle	When the unit has 3 consecutive S01 protection within 30 minutes, S11 will be reported.
		Description	Refer to the troubleshooting of cooling anti-freeze protection (S01).
S12	Floor preheating failure	Principle	During the operation of floor preheating , the running time of a certain stage exceeds the specified time, S12 will be reported and unit will exit preheating operation, while the unit can still operate in normal modes;
		Description	1.Check the recorded data of floor preheating to figure out where the anomaly is. Depending on the conditions of floor drying at site, choose if unit should run floor preheating again; 2.Tc (Heating/cooling Temp. Sensor) installation position is not suitable which results in temperature reading deviation. Check whether the temperature difference between Tc (Heating/cooling Temp. Sensor) and the actual temperature is too much (over 2°C);
S13	4-way valve failure	Principle	When the 4-way valve detection function is turned on, in heating or hot water mode, after the unit is running for 10 minutes, unit will detect temperature difference between ambient temperature and outdoor coil temperature for 2 minutes. When the ambient temperature value is lower than outdoor coil temperature, the unit will be locked up with failure reported and cannot be recovered until repower;
		Description	1.When unit is off, check the value of ambient temperature and the outdoor coil temperature through the operation panel and confirm if they are of same value. If yes, follow the next steps. If not, use a hot wet towel or wet paper napkin wrapped around the ambient temperature sensor and check the change of ambient temperature through operation panel. If the ambient temperature remains without change while outdoor coil temperature changes, these two sensors can be connected oppositely. Please correct them according to the wiring diagram; 2.Wiring Problems: According to the wiring diagram, check whether the wiring of 4-way valve coil is fine on PCB; 3.When the unit is running for heating and the air blowing outdoor unit is hot, 4-way valve coil can be defective. Alternatively, by switching back and forth between the heating and the cooling modes (running for about 3 minutes in each mode), listen to the 4-way valve if there is a sound of "Da". If not, replace the 4-way valve coil. If yes, check the surface of 4-way valve whether it is uneven which may result in that pin of valve does not work. If so, the 4-way valve needs to be replaced.
S14	3-way valve failure	Principle	When the 3-way valve detection function is turned on, in heating or hot water mode, when Tc (Heating/cooling Temp. Sensor) or Tw (DHW Temp. Sensor) temperature value is higher than water inlet temperature for over 12°C, the unit will report a fault and be shut down;
		Description	1.Check and confirm if water connections of the heating and DHW are wrongly connected. Try to reverse the control signal lines of the 3-way valve which are for heating and DHW, then observe whether the unit will operate normally; 2.Check and confirm if Tc (heating/cooling temp. sensor) and Tw (DHW temp. sensor) are connected oppositely. Pull out the Tw sensor from water tank and then hold it in hand and observe whether the hot water temperature sensor value follows the change. If the change is on Tc value instead of Tw, reverse the Tc and Tw sensor connections according to the wiring diagram. 3.Check if the Tc or Tw sensors has fallen off, causing the inaccurate temperature reading. If yes, install the Tc or Tw sensor correctly;

Error code

Code	Error		Analysis and Troubleshooting
S15	Reserved		
S16	Reserved		
S17	Reserved		
S18	Reserved		
S19	Reserved		
S20	Reserved		
S21	Water flow failure	Principle	When the unit has 3 consecutive insufficient water flow protection (P23) within 30 minutes, S21 is reported and unit is shut down and cannot be startup unless re-power.
		Description	Refer to the troubleshooting of insufficient water flow protection (P23).
P01	Over current Protection	Principle	When the unit detects that the input current is higher than the value set by the Eeprom of the external machine, the unit will report a fault and shutdown for protection.
		Description	Accessories and special tools: Multimeter This protection is generally caused by excessive system load. You can power on again and observe the operation of the unit: 1. If the temperature difference between the inlet and outlet water is greater than 8°C during operation, check whether the water pump speed is set to high speed (if it is low speed, please adjust to medium speed or high speed), and also check whether the filter in the water system is blocked; 2. If it is triggered in the hot water mode, you can confirm whether the domestic water tank coil is too small (the minimum heat exchange area is $3m^2$). If it is too small, it may lead to low heat exchange capacity, so heat will continue to accumulate, and eventually due to The water temperature rises too fast and the current is too large. You can temporarily turn on the hot water ECO mode to see if it can alleviate the heat exchange problem of the water tank. If the hot water ECO mode cannot solve the problem, you need to replace the coil water tank with a larger coil area (at least $3m^2$); 3. During operation, you can observe the difference between the inner coil temperature (TUP) and the outlet water temperature (TUO). Normally, the inner coil temperature is 1 to 2°C lower than the outlet water temperature. If TUP is higher than TUO, it may because the heat pump is unable to exchange heat, due to fouling of the plate changer. So the current rises and causes a fault, so as long as the plate changer is descaled and cleaned, the problem can be solved; 4. When triggered in cooling mode, you can check whether the evaporator is dirty or blocked or the heat island effect is caused by the installation position, resulting in high current. You can clean the evaporator, adjust the installation location, or install an discharge duct to eliminate the heat island effect; 5. The electronic control parameters are set incorrectly, resulting in false alarms of the unit. At this point you can try to upgrade the main PCB EEPROM settings. 6. Check whether the input voltage is normal. If it is lower than the rated voltage by more than 10%, the overcurrent protection may be triggered. Please contact the power supplier to adjust the power supply voltage.
P02	Compressor phase current overload protection	Principle	When the driver PCB detects that the compressor phase current exceeds the compressor phase protection current value, the unit will report a fault and shutdown.
		Description	Accessories and special tools: clamp meter, multimeter This protection is generally caused by excessive system load. You can power on again and observe the operation of the unit: 1. If the temperature difference between the inlet and outlet water is greater than 8°C during operation, check whether the water pump speed is set to high speed (if it is low speed, please adjust to medium speed or high speed), and also check whether the filter in the water system is blocked; 2. If it is triggered in the hot water mode, you can confirm whether the domestic water tank coil is too small (the minimum heat exchange area is $3m^2$). If it is too small, it may lead to low heat exchange capacity, so heat will continue to accumulate, and eventually due to The water temperature rises too fast and the current is too large. You can temporarily turn on the hot water ECO mode to see if it can alleviate the heat exchange problem of the water tank. If the hot water ECO mode cannot solve the problem, you need to replace the coil water tank with a larger coil area (at least $3m^2$); 3. During operation, you can observe the difference between the inner coil temperature (TUP) and the outlet water temperature (TUO). Normally, the inner coil temperature is 1 to 2°C lower than the outlet water temperature. If TUP is higher than TUO, it may because the heat pump is unable to exchange heat, due to fouling of the plate changer. So the current rises and causes a fault, so as long as the plate changer is descaled and cleaned, the problem can be solved; 4. When triggered in cooling mode, you can check whether the evaporator is dirty or blocked or the heat island effect is caused by the installation position, resulting in high current. You can clean the evaporator, adjust the installation location, or install an discharge duct to eliminate the heat island effect; 5. The electronic control parameters are set incorrectly, resulting in false alarms of the unit. At this point you can try to upgrade the main PCB EEPROM settings. 6. Check whether the input voltage is normal. If it is lower than the rated voltage by more than 10%, the overcurrent protection may be triggered. Please contact the power supplier to adjust the power supply voltage.

Error code

Code	Error		Analysis and Troubleshooting
P03	IPM module protection	Principle	During compressor operation, the IPM module is detected to be over-temperature protected (the protection value is generally 95-100°C) or over-current protected, and the unit reports a fault and shutdown;
		Description	Accessories and special tools: clamp flow meter, Multimeter 1. Refer to the P02 troubleshooting method 2. In cooling mode, please check whether the fan is running normally (whether the speed is low, such as below 500 rpm) or only one fan is running in the dual fan system, if yes please refer to the handling of fan failure, check and replace the motor if needed. If the speed is low, contact the manufacturer for further investigation; 3. In cooling mode, you can check whether the evaporator is dirty or blocked or the heat island effect is caused by the installation position, resulting in high current. You can clean the evaporator, adjust the installation location, or install an discharge duct to eliminate the heat island effect; 4. Change drive PCB
P04	Reserved		
P05	High pressure switch protection	Principle	Fault shutdown is reported when a high pressure switch port disconnection is detected for 5 seconds after the compressor has been started for 1 minute;
		Description	1. Please check error history to see if the high pressure value is higher than 42 Bar when unit report this error; if so, please check the value of high pressure sensor (please refer to High Pressure Sensor Failure section for description). If the most recent HV protection was less than 41 bar, the HV pressure sensor may be faulty, try replacing the HV switch. 2. Check if there is insufficient heat dissipation on the high-pressure side (condensing side) Data recording, after confirming the temperature difference between the inlet and outlet water, shut down and repower the unit. Then the following judgments are made: -2.1. Confirm that the temperature difference between the water inlet and outlet is within 5°C, if it exceeds 8°C, please check whether the water pump is set to low speed, if yes please try to let the water pump run at medium or high speed, to ensure that the water flow is within the normal range; Also please check the filters in the water system, whether there is a dirty blockage, and then clean it; 2.2. Confirm the temperature difference between the outlet water temperature and the TC temperature or TW temperature. Normally, the outlet water temperature will be 3 to 5°C higher than the TC or TW, if it is more than 5°C, please check whether the installation position of the TC and TW sensors is installed in an inappropriate position, the TC or TW should be installed in the middle and upper part of the water tank as far as possible; 2.3. During the operation of the unit, observe whether the temperature of the inner coil is higher than the temperature of the outlet water. If the temperature of the inner coil is higher than the temperature of the outlet water by more than 3°C, check if there is fouling of the plate changer. As long as the plate changer is descaled and cleaned, the problem can be solved; there is scaling in the plate exchange, and it is necessary to clean the water side of the plate exchange to remove the scale; 2.4. If it occurs in cooling mode,please check for poor ventilation around the unit, you can compare the value between ambient temp. Sensor and real ambient temp, if the difference between the two values is more than 5°C, there may be poor ventilation, and you can consider adding an air guide to the unit. So that hot air can be vented in a timely manner; Please check if evaporator is blocked by dirt, clean the evaporator. 3. If all of above solutions can not solve the problem, the EEV may be abnormal, please refer to the “EEV troubleshooting section".
P06	High pressure overpressure protection	Principle	If the high pressure is higher than the system pressure protection value after the compressor has been started for 1 minute, the unit will report faulty shutdown protection;
		Description	1.Determine if there is insufficient heat dissipation on the high-pressure side (condensing side). After recording the data and confirming the temperature difference between the inlet and outlet water and the outlet water temperature at the time of the unit's protection shutdown, power down and restart the unit to allow the unit to run again, and make the following judgments during the operation process: 1.1. Confirm that the temperature difference between the inlet and outlet water of the unit is within 5°C, if it exceeds 8°C, please check whether the running gear of the water pump is set to low speed, and try to let the water pump run at medium or high speed to ensure that the water flow is within the normal range; check the filters in the water system, whether there is a dirty blockage, and then clean it; 1.2. Confirm the temperature difference between the outlet water temperature of the unit and the TC temperature or TW temperature, under normal circumstances, the outlet water temperature will be 3 to 5°C higher than the TC or TW, if it is more than 5°C, please check whether the installation position of the TC and TW sensors is checked off or installed in an inappropriate position, the TC or TW should be installed in the middle and upper part of the water tank as far as possible; 1.3. During the operation of the unit, observe whether the temperature of the inner coil is higher than the temperature of the outlet water. If the temperature of the inner coil is higher than the temperature of the outlet water by more than 3°C, there is scaling in the plate exchange, and it is necessary to clean the water side of the plate exchange to remove the scale; 1.4. If it occurs in cooling mode, check for poor ventilation around the unit, check the evaporator of the outdoor unit for dirt and blockage, and clean debris from the outdoor heat exchanger; Check for poor ventilation around the outside unit, compare the outdoor temperature sensor display and the measured outdoor temperature on site to see if there is a big difference, if the difference between the two is more than 5°C, there may be poor ventilation, and you can consider adding an air guide to the unit. Circle so that hot air can be vented in a timely manner; 2.If the above troubleshooting is unable to solve the problem, the EEV may be abnormal, please refer to the "EEV troubleshooting section".

Error code

Code	Error		Analysis and Troubleshooting
P07	Initial power-up preheat protection	Principle	When the unit is powered on, if the ambient temperature is lower than -5°C, the unit will warm up for 30 minutes, report the protection, system will turn on the compressor electric heat tape, and the unit will not be allowed to turn on.
		Description	There is no need to deal with it, just leave the unit to warm up for 30 minutes, but with the current version of the program, the line controller will not report a P07 fault;
P08	High discharge temperature protection	Principle	When the discharge temperature is higher than value of protection shutdown point (generally between 110°C and 115°C) during unit operation, the unit will report a malfunction shutdown;
		Description	Accessories and special tools: discharge temperature sensor, refrigerant, refrigerant leak detector, pressure gauges. electronic scale, multimeter 1. Examine the factors of insufficient refrigerant: 1.1.Under the standby mode which longer than 30 mins, check the refrigerant pressure value, and confirm whether there is serious leakage of refrigerant quantity initially. The judgment way is: whether the saturation temperature corresponding to the pressure value currently displayed, is the same as the ambient temperature, and if it is lower than the ambient temperature by more than 5°C, it can be judged that there is a leakage of refrigerant basically; 1.2.For split units, check whether the refrigerant piping exceeds 15 meters and the refrigerant is not replenished; if so, replenish the refrigerant according to the length of the piping; 1.3. You can try to start the machine, and observe the change of low pressure, if the low pressure is too low (i.e. the evaporating temperature is lower than the ambient temperature by more than 10°C), and the running time is more than 5 minutes, you can initially judge that it is suspected that the refrigerant is leaking, and you can temporarily add approx. 100-200g of refrigerant to see whether the low pressure of the system is rising or not. And whether the discharge temperature is dropping. If so, you can find the leakage point in the unit, and make up for the leakage. Re-evacuate the unit and refill the refrigerant according to the refrigerant quantity on the nameplate; 2. Examine the factors of insufficient heat transfer. Please check the error history, if there is no high pressure protection, the effect of poor heat exchange can be ruled out. 3. Sensor problem: Pull out the sensor from the PCB, and use a multimeter to test the function of the resistance, measure the resistance of the sensor, and compare with the table of 50K temperature -resistance table, if there is a large deviation, then replace the discharge temperature sensor; 4. If the above troubleshooting fails to solve the problem, the EEV of the refrigerant system may be abnormal, please refer to "EEV troubleshooting section".
P09	Outdoor coil over-temperature protection	Principle	In the cooling mode, the external coil temperature is higher than the external coil over-temperature protection value (usually around 62°C), then the unit reports a fault and shutdown;
		Description	Accessories and Specialized Tools: Motors 1. In cooling mode, please confirm whether the fan motor is running normally (whether the speed is low, such as less than 500 rpm) or only one fan is running in the dual fan system. If yes, please refer to the solution of fan motor failure, investigate and replace the motor. If the speed is low, please contact the manufacturer for further investigation; 2. In cooling mode, you can check whether the evaporator is dirty or blocked or the heat island effect is caused by the installation position, resulting in high current. You can clean the evaporator, adjust the installation location, or install an discharge duct to eliminate the heat island effect;
P10	Input voltage over-under-voltage protection (only for single-phase units)	Principle	When the unit is energized (either running or standby) and the input voltage is detected to be lower than 140V or higher than 270V, the unit will report a fault and shutdown;
		Description	Accessories and special tools: main PCB, fan motor, multimeter 1. Using a multimeter, measure whether the voltage between LN line is normal nor not, and the voltage range of the single phase unit should be in the range of 140V-270V. 2. Disconnect the power, unplug the DC fan from the PCB, and then re-power to confirm whether the voltage detection abnormality is caused by the damage of the motor. If the fault is cleared, then replace the DC fan, if the fault is not cleared, then replace the main PCB;
P11	Ambient temperature over range shutdown protection	Principle	Heating mode: when the ambient temperature is lower than -25°C, or the ambient temperature is higher than 45°C, the unit will report a fault and shutdown; Cooling mode: when the ambient temperature is lower than 8°C, or the ambient temperature is higher than 65°C, the unit will report a fault and shutdown;
		Description	Accessories and special tools: ambient temperature sensor, multimeter 1. Through the multimeter, test if the ambient temperature sensor resistance value corr esponding to temperature resistance table, if there is a deviation, then replace the sensor 2. Confirm whether the current actual ambient temperature reaches the limitation point of he at pump ambient temperature. If so, please wait for the ambient temperature reach to a normal range, and the unit will back to normal; 3. Check whether the installation position of the ambient sensor is blocked by ice or exposed to direct sunlight, if so, please protect the ambient temperature sensor, to prevent icing or exposure to direct sunlight; 4. Check whether there is any heat island effect (cold island effect) in the installation position of the unit, and adjust the installation position or install an discharge duct to eliminate the heat island or cold island effect;

Error code

Code	Error		Analysis and Troubleshooting
P12	Environmental frequency limiting protection (EFLP)	Principle	When the unit detects that the heat pump is not allowed to run the highest frequency at the current ambient temperature, the outdoor unit will feedback the ambient frequency limit flag bit, but the unit will still run normally, and the unit will not display this error code.
		Description	This error will not show in display, but if target water temperature have a big difference with real water temperature, and unit could not running in high speed, you can consider if it because the ambient temperature is too high, so frequency is limited. You can confirm the accuracy of the ambient temperature check according to the troubleshooting of P11;
P13	Low pressure switch protection	Principle	When the unit has been up and running for 3 minutes, if a low voltage switch disconnection is detected, a fault is reported;
		Description	Accessories and specialized tools: short cables, main PCB According to F11 low pressure checking this error, since the unit does not have low pressure switch, this protection does not normally occur. If it does, follow the wiring diagram to check whether the reserved input port has not been shorted, resulting in a false alarm;
P14	Reserved		
P15	Reserved		
P16	Refrigerant leak	Principle	When equipped with refrigerant leakage detection function, if refrigerant leakage is detected, reported the P16 , the unit will be stopped
		Description	Accessories and tools: refrigerant leakage detector. main PCB. multimeter. USB disk 1.When unit is in Off state, check the refrigerant pressure value in standby state through operation panel(standby time should more than 30 minutes),to confirm whether there is a serious leakage of refrigerant firs.The judgment: whether the saturation temperature that corresponding to the current displayed refrigerant pressure value is the same as the ambient temperature, and if the refrigerant pressure value is lower than the ambient temperature by more than 5℃, then can judge that there is a leakage of refrigerant basically; 2.Check whether the refrigerant system have leakage problem, use refrigerant leakage detector, check inside the compressor cabinet, check if the refrigerant detection box have leakage alarming, if so, can double check where the leakage point is, if not, carry out the check in step 3; 3. Replace the refrigerant detector(sensor), and then repower the unit, to analyze the way according to step 4; 4. Observe the change of low pressure, if the low pressure is too low (i.e. the evaporating temperature is lower than the ambient temperature by more than 10°C), and the operation time of the unit is more than 5 minutes, it can judge there is a leakage point. Can temporarily supplemented with 100-200g refrigerant to see if the low pressure will have rebound, if so, re-vacuum the unit and re-inject the refrigerant according to the refrigerant amount on the nameplate;
P17	Reserved		
P18	Low pressure protection	Principle	When the unit detects that the low pressure value is lower than the protection value during operation, the unit will shut down and report a fault.
		Description	Accessories and tools: refrigerant, leakage detector, pressure gauge, vacuum pump, USB disk 1. When unit is off, read refrigerant pressure value from display (unit should stay standby >30min) for first judgement if serious leakage happens. If saturation temperature corresponding to the displayed refrigerant pressure is at same level of ambient temperature, it is fine. If it is lower than ambient temperature for more than 5°C, leakage could happen. 2. For split units, check whether the refrigerant piping exceeds 15 meters and the refrigerant has not been replenished; if so, replenish the refrigerant according to the length of the piping; 3. Start the unit and observe the change of low pressure. If the low pressure is too low (i.e., the evaporating temperature is lower than the ambient temperature by more than 10°C), and the running time is more than 5 minutes, it can be preliminarily judged as a potential leakage. Fill about 100 to 200g to see whether the low pressure of the system is increased. If yes, proceed leakage test on the system. After finding out leakage point and fixing it, vacuum the heat pump system. Then recharge the unit with correct amount of refrigerant based on info from nameplate.
P19	Reserved		
P20	Reserved		
P21	Reserved		
P22	Reserved		

Error code

Code	Error		Analysis and Troubleshooting
P23	Insufficient water flow protection	Principle	When the water flow is detected to be less than the minimum flow rate (1080L/h for 15KW), the unit will report a fault and shutdown.
		Description	Accessories and special tools: water flow sensor, Main PCB, Multimeter 1. Check if the system displays a water flow value that is near or less than the minimum allowable water flow while the pump is running, if yes please check the reasons of insufficient water flow, and find the relatived solution. 1.1. Check that the water system is completely emptied, if the water pressure is above 2 bar, if all valves are opened, if the filter is clogged. 1.2. Check that the water pump operates normally, and water flow is in the correct direction after switching on. 1.3. In running condition, wait for the compressor run for 5 minutes, if the water inlet and outlet temperature difference is in a reasonable range, then remove the water flow sensor, clean it and reinstall it, then restart the unit to exclude the possibility of foreign objects interfering with the detection of the water flow sensor. If the problem still cannot be solved, replace the water flow sensor and restart the unit. 2. If the water flow display value is 0, then check whether the water flow sensor is not contact well; If it is ok, and find the terminal of water flow sensor according to the wiring diagram. Under the condition of ininterrupte the power supply, then use a multimeter (DC level), measuring the water flow sensor power supply is 24V or not. When the water pump is running, the water flow sensor feedback voltage is higher than 0. If yes, then if the supply of water flow is not 24V, if yes then replace the indoor PCB. If the water flow sensor feedback voltage is equal to 0, pull out the water flow sensor cable from the water flow sensor body, and measure whether the terminals at both ends of the connecting wire are on or not. If not, replace the cable; If yes, change the water flow.
P24	Reserved		
P25	Reserved		
P26	Reserved		
P27	Reserved		
P28	Sterilization failure	Principle	When the unit enters sterilization, if the water temperature in the water tank does not reach the sterilization target temperature within the set time, a protection will be reported. At this time, the user can click to choose whether to re-enter sterilization or cancel and wait for the next sterilization.
		Description	1. Check whether the hot water temperature sensor has fallen off, causing inaccurate temperature detection; 2. The unit is not equipped with electric heating or other heat sources to heat the water to the sterilization temperature.

Troubleshooting 1

Troubleshooting of non-heating, high power consumption, and high exhaust temperature

Fault category	Main reasons	Breakdown of reasons	Checkpoints	Treatment program
No warming or high power consumption	Problems matching for the unit and terminals	The house has a lot of space and poorly insulated exterior walls	Review of selection	Enhanced insulation
		The heating end is small, resulting in the house failing to meet the heating standard when the water temperature is set low; or when the water temperature is set high, the unit starts and stops frequently, resulting in high power consumption.	Review of selection	Increase the terminals heating area
		Floor heating	Initial use, high water content in underfloor heating Underfloor heating hasn't been cleaned for a long time	1.Run the "underfloor heating first heat function" 2.Cleaning the underfloor heating system
	Problems with auxiliary heat sources	Unreasonable setting of auxiliary heat source	1. Whether the integration time of the heating auxiliary heat source is set too high or too low. 2. Whether the turn-on time of the hot water auxiliary heat source is set too high or too low. -Setting it too high and at low temperatures, it does not replenish the heat source in time, resulting in no heating temp increase; -Setting it too low, the heat source turns on early at medium to high temperatures, resulting in high power consumption;	Adjust the calculated value according to the actual temperature rise of the unit
	Problems with the heating curve function	Heating curve parameters are not set properly	1.The heating curved water temperature setting is low, resulting in water temperatures that do not reach the desired heating temperature; 2.The water temperature setting of the heating curve is high, which leads to high water temperature for a long period of time and brings high power consumption.	Optimally adjust the water temperature and ambient temperature settings of the heating curve function according to the actual heating and thermal insulation of the house
	Defrost Abnormal (Excessive defrost time)	Outdoor coil temperature sensing inaccuracy	1.Check the sensor mounting location for the presence of no frost 2.Detect if the sensor is loose	1.Check to see if the outdoor coil temperature is growth slowly or not during unit defrost operation, try changing the outdoor coil temperature sensor position; 2.Defrost time exceeds 8 minutes and the coil temperature does not reach the temperature exit point and there is a high pressure pressure bias for high (R32-36bar,R290-26bar) conditio ns, try troubleshooting for a loose or a temperature sensing head for external coil temperature sensor.
	Defrost Abnormal (does not enter defrost)	The conditions are not met.	Outdoor coil temperature sensor problems	1.Loose or abnormal sensor 2.Outdoor coil temperature sensor in wrong position with other sensors
			Frequent starts and stops (running time less than 5 minutes)	Check the TC temperature sensor installation position whether there is a temperature sensing inaccuracy, sensor installation position adjustment.
			Evaporator refrigerant flow path distribution abnormality	Observe the evaporator frost situation, whether there is uneven frost phenomenon, especially the position of where coil temp sensor installed, whether there is no frost situation, if so, the coil temp sensor position to move to the frost serious coil position.

Troubleshooting 1

Fault category	Main reasons	Breakdown of reasons	Checkpoints	Treatment program
No warming or high power consumption	Defrost Abnormal (does not enter defrost)	The conditions are not met.	Multi-unit defrosting allows control of logical limitations	In the system, only 1/3 of the units are allowed to defrost at the same time, and when more than 1/3 of the units have a need for defrosting, the system will limit the number of defrosting units, if the unit can enter defrosting after a short wait, it is a normal situation.
	Defrost Abnormal (not fully defrost)	Uneven frost formation	Abnormal distribution of refrigerant flow path in evaporator	Observe the frosting situation of the evaporator of the unit to see if there is uneven frosting, especially on the circuit where the outer coil temp sensor is installed. If so, move the position of the outer coil temp sensor to a circuit that is severely frosted and cannot be cleaned; (Analysis of frost formation in the unit, as shown in the figure)
		Low defrost exit temperature	Confirm the evaporator coil temperature when exiting defrosting	During the defrosting operation of the unit, observe the evaporator defrosting situation when the coil temperature reaches the exit temperature. If there is still a large portion of defrosting left, try increasing the exit coil temperature setting value, such as 20 degrees or 25 degrees.
		Switching problem of 4-way valve	1.The coil of the 4-way valve itself is damaged 2.The 4-way valve is stuck and cannot be reversed	1.Check if the coil of the 4-way valve is disconnected or burnt out 2. Check if the 4-way valve has gas leakage
		Defrosting failed	First defrosting with low ambient temperature and water temperature during initial operation	Close the 2/3 end heating terminals, then allow the water temperature in the buffer water tank to rise above 30 degrees before slowly opening the end heating terminals for heating operation.
	Defrost Abnormal (defrost failed)	During the defrosting process, the outlet water temperature is below 15 degrees, causing defrosting failure	1.Insufficient water volume in the system, such as a radiator or fan at the end without a buffer water tank 2. Check if the temperature set by the controller is too low, such as below 30 degrees Celsius	1. Add buffer water tank 2. Increase the set temperature to above 32°C
		First installation, operating at low ambient and water temperatures	During the first defrosting cycle, the water temperature is too low	After closing most of the end terminals, the machine can be restarted to increase the water temperature of the buffer tank as soon as possible. After the increase, the other end terminals can be slowly opened in batches to reduce the impact of the ends on the water temperature.
		Excessive difference in inlet and outlet water temperature	1.The filter is dirty and blocked, causing excessive inlet and outlet temperature 2. The water pump is set to work in low speed, causing a big difference in inlet and outlet water temperature	1. Clean the filter in the water system again 2. Set the water pump to high speed working
		Inaccurate detection of outdoor coil temperature sensor	1.Check if the sensor position if without frost 2.Check if the sensor is loose	1. During the defrosting operation of the unit, observe whether the coil temperature change slow or not, and try changing the temperature position of the coil temp sensor. 2. If the defrosting time reaches 10 minutes and the coil temperature does not reach the temperature exit point, and there is a high pressure (36bar, R290 is 26bar), try to investigate the looseness of the outer coil temperature

Troubleshooting 1

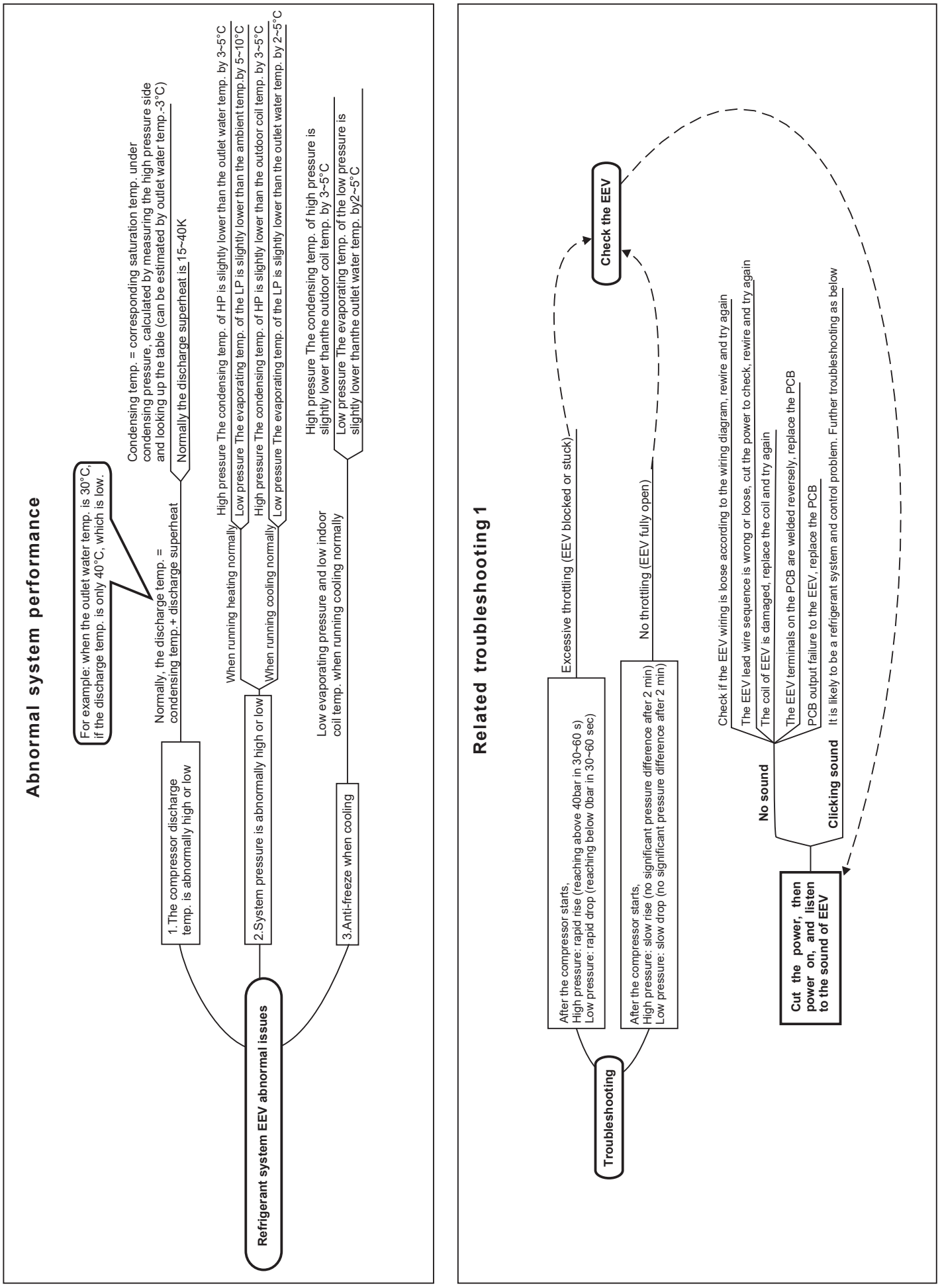
<table>
<tr><th>Fault category</th><th>Main reasons</th><th>Breakdown of reasons</th><th>Checkpoints</th><th>Treatment program</th></tr>
<tr><td rowspan="6">No warming or high power consumption</td><td rowspan="2">Defrost Abnormal (frequent defrosting)</td><td>Low ambient temperature and high ambient humidity</td><td>Normal phenomenon</td><td>No processing required</td></tr>
<tr><td>At about 0 degrees ambient temperature, the unit is defrosted regularly, i.e., the defrost cycle is 50 minutes.</td><td>Normal phenomenon</td><td>For the ambient temperature of about 0 degrees, the unit does not have a serious case of frost, you can turn off the timed defrost function in this interval, and change it to intelligent defrosting mode.</td></tr>
<tr><td rowspan="4">The mainframe has not reached the frequency reduction point, but is operating at a limited frequency</td><td>Ambient temperature cause limited frequency operation</td><td>1. Confirm whether the current ambient temperature of the unit is the frequency limit zone (detecting ambient temperature higher than 11 degrees above but the actual ambient temperature is not that high)</td><td>Check to make sure that there is no deviation between the ambient temperature detected by the unit and the actual ambient temperature (The frequency will be limited when the unit detects that the ambient temperature is higher than 11 ℃）.</td></tr>
<tr><td>Exhaust gas temperature over high limit frequency protection</td><td>Through the controller, check if the unit exhaust temperature triggers the frequency limit protection</td><td>If the current exhaust temperature is greater than the protection values in the table below, if so, refer to P08 in error code list.
<table><tr><td colspan="2">Exhaust limit value</td></tr><tr><td>Models</td><td>R290</td></tr><tr><td>6K</td><td>95°C</td></tr><tr><td>9K</td><td>95°C</td></tr><tr><td>12K</td><td>95°C</td></tr><tr><td>16K</td><td>95°C</td></tr><tr><td>19/20K</td><td>95°C</td></tr></table></td></tr>
<tr><td>High pressure frequency-limiting protection</td><td>Via the controller, see if the unit's high-pressure pressure triggers the frequency-limiting protection</td><td>If the current high pressure value is greater than the protection value in the following table, if so, please refer to P06 in error code list.
<table><tr><td colspan="2">High-pressure limit values</td></tr><tr><td>Models</td><td>R290</td></tr><tr><td>6K</td><td>26bar</td></tr><tr><td>9K</td><td>26bar</td></tr><tr><td>12K</td><td>26bar</td></tr><tr><td>16K</td><td>26bar</td></tr><tr><td>19/20K</td><td>26bar</td></tr></table></td></tr>
<tr><td>Refrigeration anti-freezing frequency limit protection</td><td>With the controller, see if the unit's low pressure triggers the frequency limit protection</td><td>If the current low pressure value (corresponding to the evaporating temperature) is less than the protection value in the following table, if so, refer to S01 in error code list.
<table><tr><td colspan="2">Refrigeration anti-freezing evaporating temperature</td></tr><tr><td>Models</td><td>R290</td></tr><tr><td>6K</td><td>4°C</td></tr><tr><td>9K</td><td>4°C</td></tr><tr><td>12K</td><td>4°C</td></tr><tr><td>16K</td><td>4°C</td></tr><tr><td>19/20K</td><td>4°C</td></tr></table></td></tr>
<tr><td>Low noise mode</td><td>1.Verify that the unit is operating in low noise mode
2.Confirm that the frequency gear setting for the low noise mode is not too low</td><td>1. If low noise mode operation is not required at this time of the day, turn low noise mode off or adjust the low noise mode timer operation time period;
2. The gear of the limit in the low noise mode can be increased appropriately;</td></tr>
</table>

Troubleshooting 1

Fault category	Main reasons	Breakdown of reasons	Checkpoints	Treatment program
High exhaust temperature protection	Refrigerant leakage Insufficient refrigerant	1.Leakage due to poor solder joints 2.Transportation irregularities lead to cracked copper pipes 3.Split unit refrigerant pipe connection port leakage 4.Improper use causes heat exchanger to freeze up	1.Electronic leak detector for leak detection 2.If all the refrigerant in the system leaks, a small amount of refrigerant needs to be filled for leak detection	1. Find the leakage point 2. After the leak detection is completed, recover the residual refrigerant in the system 3. Repair welding (nitrogen filling protection). If the refrigerant pipe connection port leaks, remake the refrigerant pipe connection port and tighten the nut according to the operating specifications 4. Add refrigerant according to the refrigerant filling amount on the nameplate
	After maintenance	1. Welding beryllium oxide or foreign objects blocking the refrigerant filter 2. Moisture enters the refrigerant system during maintenance	1. Weld down the electronic expansion valve assembly and check for any dirt or blockage 2. Replace the filter	1. Welding (nitrogen filled protection) 2. Vacuum, after the vacuum pressure is below -0.1bar, continue to vacuum for more than 30 minutes 3. Add refrigerant according to the refrigerant filling amount on the nameplate
	Problems with water system	1.Insufficient water flow leads to a large temperature difference between inlet and outlet water 2.Dirty water-side filter clogging 3.Poor heat transfer due to air into the water system 4.Heat exchanger scaling due to poor water quality	Check the water system	1. Drain the water inside of unit 2. Clean the filter 3. Scale removal and cleaning of water system 4. Fill with softened or purified water
	Control issues	1. Exhaust sensor resistance failure, resistance drift 2. Incorrect setting of exhaust protection parameter values 3. Main and auxiliary valve regulation failure 4. Severe frost formation and prolonged non frost formation	1. Check the exhaust temperature sensor 2. Check the Epprom parameters of the outdoor unit 3. The output ports of the main and auxiliary valves on the main PCB are damaged 4. The coil or valve body of the electronic expansion valve is damaged	1. Check the exhaust temperature sensor 2. Check the Epprom parameters of the outdoor unit 3. The output ports of the main and auxiliary valves on the main PCB are damaged 4. The coil or valve body of the electronic expansion valve is damaged
	Installation issues	1. Poor installation environment leads to dirty and blocked outdoor heat exchanger 2. Poor heat exchange caused by improper installation position and lack of ventilation 3. Failure to place TC and TW sensors as required resulted in control deviation	Troubleshooting according to the installation requirements in the manual	1. Clean the debris from the outdoor heat exchanger 2. Relocation that does not meet installation specifications to ensure ventilation requirements 3. If it is not possible to move the machine, install a guide air duct

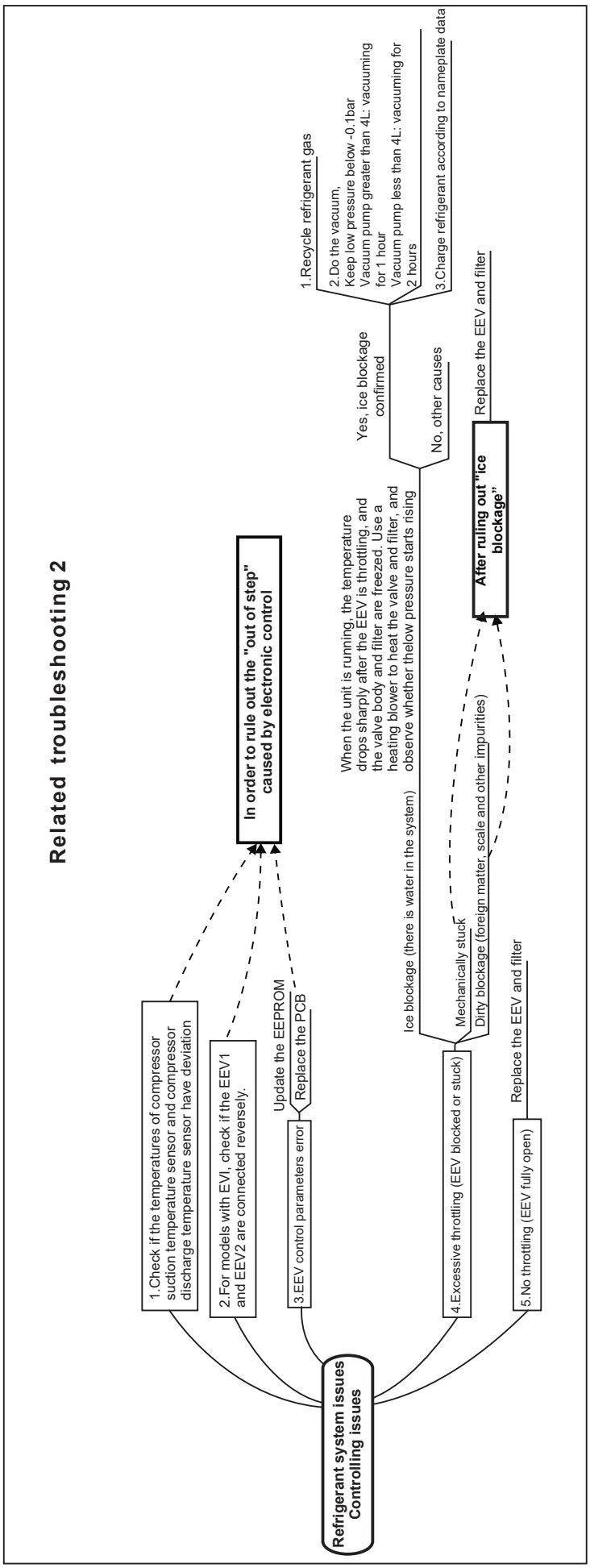
Troubleshooting 2

EEV troubleshooting



Troubleshooting 2

EEV troubleshooting



Thank you for purchase of our quality product.
Please read this manual thoroughly before use, and follow the instructions carefully in operating the unit in order to prevent damages to either the device or persons.

Product specifications are subject to change with improvements, without prior notice. Please refer to the specification sticker on the unit for the most recent specifications.