ORBIT

VRFPLUS™

APPLIED COMMERCIAL AIR CONDITIONING

ComfortStar®

VRF

trouble shooting

VRF Error Table

Fault or protect definition

Code	Fault or protect definition	XH9	3 times P9 protection in 30 minutes
E0	Outdoor communication failures	P0	Reserve
E1	Sequence fault	P1	High pressure protection
E2	Indoor and host communication failures	P2	Low pressure protection
E3	Exhaust temperature sensor fault	XP3	INV over AC current protection
E4	Environmental temperature sensor T4 fault	P4	Exhaust temperature is too high to protect
E5	T6A Plate heat exchanger inlet sensor fault	P5	Condensate T3 high temperature protection
E6	T3 Condensate temperature sensor fault	XP6	IPM module protection
E7	T6B Plate heat exchanger outlet sensor fault	P7	The lack of the degree of superheat
E8	Outdoor address fault	XPA	Temperature sensor T8 is too high to protect
E9	AC voltage protection	XP9	DC fan module protection
EA	Refrigerant cooling copper tube temperature sensor fault	XL0	DC compressor module fault
XH0	Communication failures between module board and main control board	XL1	DC low voltage protection
H1	Communication failures between main chip and slave chip of the main control board	XL2	DC high voltage protection
H2	The decrease in the number of outdoor failures	XL4	MCE fault/synchronous/closed loop
H3	The increase in the number of outdoor failures	XL5	Zero speed protection
XH4	3 times P6 protection in 60 minutes	XL7	Phase sequence error protection
H5	3 times P2 protection in 60 minutes	XL8	A moment before and after the speed change > 15 Hz
H6	3 times P4 protection in 100 minutes	XL9	Set speed and the actual speed difference > 15 Hz
H7	The decrease in the number of indoor failures	PA----	Need to enter password prompt for password
H8	Pressure sensor fault	XP8	Drive type mismatch
XH9	3 times P9 protection in 30 minutes	XH9	3 times P9 protection in 30 minutes

VRF Operating Parameters Table

LED display in check procedures

No.	Display	Refernce values	No.	Display	Refernce values
	Current frequency (indoor unit quantity when unit in standby mode)				
1	This outdoor unit address	0, 1, 2, 3	35	Secondary side current of inverter compressor B	Actual value (A)
2	This outdoor unit capacity address	0-F,The corresponding number of outdoor units is shown in the table on the nameplate of the outdoor unit	36	AC voltage	Actual value (A)
3	Number of online outdoor units	Available for master unit only	37	DC bus line voltage of compressor A	Actual value =Display value * 4(V)
4	Total capacity of outdoor units	When paralleling, available for master unit only	38	DC bus line voltage of compressor B	Actual value =Display value * 4(V)
5	Number of outdoor units in operation	Master display only	39	Priority mode	0: Auto priority 1: Heating priority 2: Cooling priority 3: Heating only 4: Cooling only 5: VIP priority and auto priority
6	Total HP of outdoor units in operation	Master-slave display			
7	Maximum online indoor units quantities	The maximum total number of indoor units used to communicate with outdoor units	40	Silence mode	0: Standard mode; 1: Silence mode 1 ; 2: Silence mode 2 ; 3: Silence mode 3 ; 4: Night silence mode
8	Current online indoor units quantities	Current total number of indoor units communicating with outdoor units			
9	Quantities of indoor units in operation	Current total number of indoor units with cooling or heating mode	41	Static pressure mode	0: Standard mode; 1: Low pressure ; 2: Medium pressure; 3: High pressure; 4: Super high pressure
10	Running mode	0: Off or fan only 2:Cooling only 3:Heating only 4:Forced cooling 5:Forced heating			
11	Total capacity demand of indoor units	Available for master unit only	42	VIP indoor unit address	
12	Amended capacity demand for the master unit	Available for master unit only	43	Refrigerant status	0: Normal 1: Excessive refrigerant 2: Serious excessive refrigerant 11: Lack of refrigerant 12: Lack of much refrigerant 13: Lack of too much refrigerant
13	Output capacity of outdoor unit	Actual output HP			
14	Low pressure value	Actual value= Display value * 0.01 (Mpa)	44	T2B condition A	Factory default 8, setting range: 5-15
15	High pressure value	Actual value= Display value * 0.1 (Mpa)	45	T2 condition B	Factory default 44, setting range: 40-50
16	Fan speed range	0~36	46	Energy saving value	Factory default 100%, setting range: 100%-40%
17	Average temperature of evaporators T2/T2B	Actual value (℃)	47	Maximum defrost time	Factory default 10 minutes, setting range: 5-20 minutes
18	Temperature of condenser outlet T3	Actual value (℃)	48	Defrosting T3 temperature exit condition	Factory default 15℃, setting range: 10-18℃
19	Ambient temperature T4	Actual value (℃)	49	Allowed offline time of indoor unit	Factory default 60 minutes, can be set as 60,120,180,240,480
20	Temperature sensor T5	Reserve	50	Number of allowed offline indoor units	Factory default 2, setting range: 0-6
21	Inlet temperature(T6A) of plate heat exchanger	Actual value (℃)	51	Reserve	Reserve
22	Outlet temperature(T6B) of plate heat exchanger	Actual value (℃)	52	T2B correction plus or minus	0-No correction 4-Unit number correction(No T2B average correction) 5-Number of units+T2B average correction+3 6-Number of units+T2B
23	Discharge temperature of inverter compressor A	Actual value (℃)			
24	Discharge temperature of inverter compressor B	Actual value (℃)	53	Reserve	Reserve
25	Temperature sensor T8	Refrigerant cooling copper tube temperature	54	Reserve	Reserve
26	Temperature of IPM A	Actual value (℃) , Internal temperature of IPM	55	Compressor A drive code	
27	Temperature of IPM B	Actual value (℃) , Internal temperature of IPM	56	Compressor B drive code	
28	Superheat degree of compressor	Actual value (℃)	57	Frequency limitation of inverter compressor A	0: Unlimited frequency 1: T4 frequency limiting 2: Pressure frequency limiting 3: Voltage frequency limiting 4: Exhaust frequency limiting 5: Current frequency limiting 6: P6 frequency limiting 7: Module temperature limiting
29	Opening degree of EXV A	8-24HP:Actual value =Display value * 8 26-32HP:Actual value =Display value * 8*6			
30	Opening degree of EXV C	Actual value =Display value * 8	58	Frequency limitation of inverter compressor B	0: Unlimited frequency 1: T4 frequency limiting 2: Pressure frequency limiting 3: Voltage frequency limiting 4: Exhaust frequency limiting 5: Current frequency limiting 6: P6 frequency limiting 7: Module temperature limiting
31	Auxiliary valve adjustment interval	0-OFF;1-Minimum opening; 2-Automatic adjustment			
32	Current of inverter compressor A	Actual value (A)	59	Reserve	Reserve
33	Current of inverter compressor B	Actual value (A)	60	Last time error fault or protection code	No protection or fault display 00
34	Secondary side current of inverter compressor A	Actual value (A)			

VRF trouble shooting

E0： Outdoor unit communication error

Reason： The communication between the slave unit and the master unit is lost, and the slave show error.

Solution：

1. Check whether the connection wire between the main board of the master and slave unit to the communication terminal is normal and whether the connection is firm ;
2. Check whether the communication line H1H2E of the master and slave unit is connected correctly, connect the corresponding letters hand in hand, prohibit star connection, use a multimeter to measure whether the communication line is open current/short current;
3. If there is no problem with the above steps, replace the communication board or main control board.

VRF trouble shooting

E1： Phase sequence malfunction

Reason： Three-phase power supply phase sequence error or lack of phase （ This fault is only reflected when phase B is missing, phase A is missing, the main control board is out of power, phase C is missing, and the fan module is out of power ）

Solution：

1. Use a multimeter to measure the phase voltage, whether it is between 220-240V, to ensure that there is no lack of phase ;
2. Check whether the power supply of the filter board is normal, the line voltage is 380V, if it is not normal, replace the filter board ;
3. The above steps are normal, replace the main control board ;

VRF trouble shooting

E2： Communication failure between indoor unit and outdoor unit ;

Reason: Communication failure between indoor unit and outdoor unit

Solution：

1. Check whether the communication wire between the communication board and the main control board is normal, confirm that the wiring is firm and the wiring harness is not damaged, then proceed to the next step ;
2. Check whether the communication wire PQE uses 2-core shielded wire and connect it correctly. Star connection is forbidden. It must be P to P, Q to Q, E to E ;
3. Check whether there is an open circuit/short circuit in the communication wire. Use a multimeter to measure the resistance between PQ to see if there is a short circuit; if there is no short circuit, short circuit PQ, and measure whether there is open circuit from the PQ terminal of outdoor unit;
4. Confirm that there is no problem with the communication wire, then check whether all the indoor unit are powered on, whether the indoor unit have addresses, make sure that the indoor unit are powered on and have addresses, if there is no address, please refer to the internal machine FE troubleshooting ;
5. If there is no problem with the above steps, it may be communication interference. Connect a 100Ω resistance between the PQ of the last indoor unit of system. If it still cannot be solved, check the interference source and eliminate it. If it still does not solve the problem, replace the communication board/main board ;

VRF trouble shooting

E3/E4/E5/E6/E7/EA： Exhaust gas temperature sensor TP/ambient temperature sensor T4/plate exchange inlet T6A sensor/condenser temperature T3 sensor/plate exchange outlet T6B sensor failure/refrigerant heat dissipation copper pipe sensor T8

Reason： Sensor reading error or sensor is damaged

Solution：

1. Confirm whether the sensor is firmly connected to the main board, reconnect it firmly, or if it is faulty, proceed to the next step;
2. Unplug the sensor, measure the resistance of the sensor, whether it is open/short, if yes, replace the sensor group, otherwise replace the main board;
3. E3 exhaust sensor failure may be inaccurate resistance （ After running for 10 minutes , Pc≥3.0MPa, TP＜15℃）

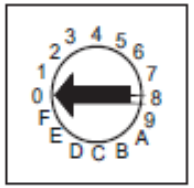
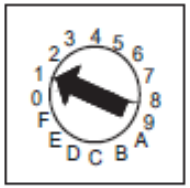
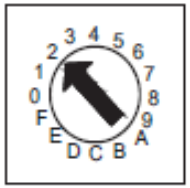
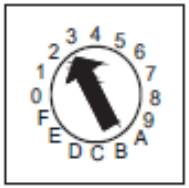
VRF trouble shooting

E8： Outdoor unit address error

Reason： Outdoor unit address dialing error

Solution：

1. Check the dialing codes of the master and slave unit, perform the dialing according to the SW6 dialing introduction, and power on again

SW6 Outdoor address setting			
			
0	1	2	3
Master	Slave 1	Slave 2	Slave 3

VRF trouble shooting

E9： AC voltage protection

Reason： AC supply voltage problem

Solution：

1. Use a multimeter to measure the voltage of the power supply phase to confirm the supply voltage (below 165V or higher than 265V) ;
2. If the power supply voltage is no problem, replace the main board ;

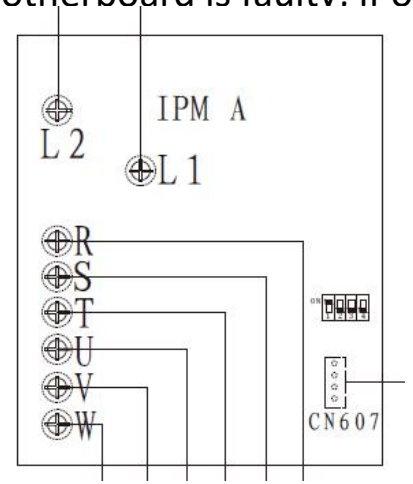
VRF trouble shooting

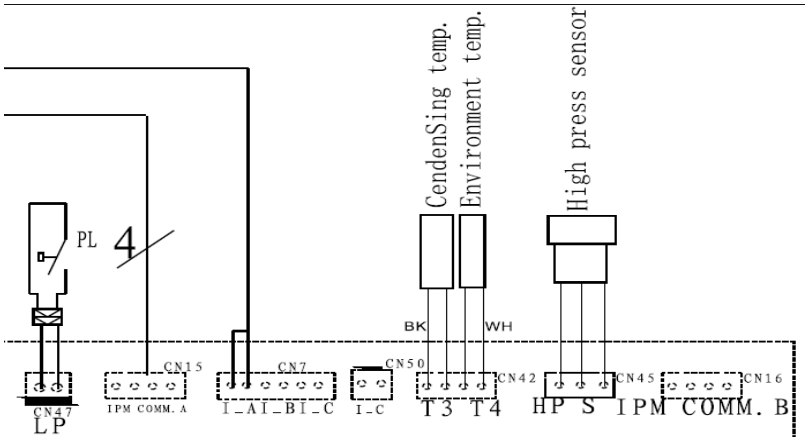
XH0： Communication failure between main control chip and DSP module board

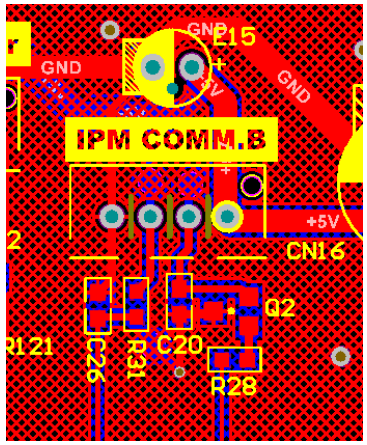
Reason： Communication failure between main control board chip and module

Solution：

1. Use a multimeter to measure the RST voltage to confirm whether the voltage is 380V, if not, check the power supply and the power supply voltage of the filter board, otherwise proceed to the next step ;
2. Check whether the connection wire of the module board and the main control board is open current/short current, confirm that it is normal and connect firmly ;
3. Determine the reference voltage between the middle port and the GND or 5V on both sides. If there are fluctuations on both ends of the multimeter's DC gear, or there is no fluctuation at both ends, then the motherboard is faultv: if one end has fluctuations and the other end has no fluctuations, the module board is faulty.







VRF trouble shooting

H1： Communication error between master chip and slave chip

Reason： The internal chip communication problem of the main control board

Solution：

1. Replace the outdoor unit main board ;

VRF trouble shooting

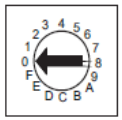
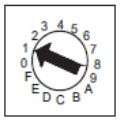
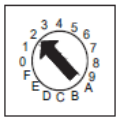
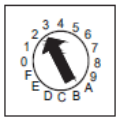
H2： Outdoor units decrease

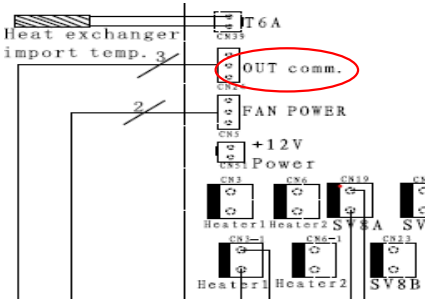
Reason： Slave unit communication lost on parallel system

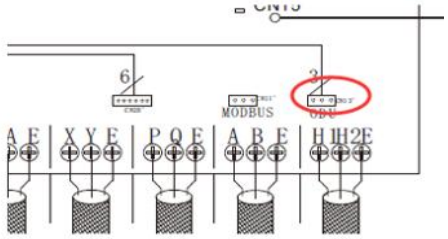
Solution：

1. Check if any slave unit is powered off, and confirm that all outdoor unit are powered on ;
2. Check whether the slave dialing code is wrong, refer to the introduction of SW6 dialing code, correct the dialing code and power on again ;
3. Check whether the connection wire from the main board to the communication terminal is normal and whether it is firmly connected ;
4. Check whether the slave communication line H1H2E is connected correctly, hand in hand connection, star connection is prohibited, use a multimeter to measure whether the communication line is open current/short current;
5. If there is no problem with the above steps, replace the communication board or main control board.

SW6 Outdoor address setting

			
0	1	2	3
Master	Slave 1	Slave 2	Slave 3





VRF trouble shooting

H3：Outdoor units increase

Reason： Master unit read slave unit quantity increase

Solution：

1. Check whether the number of master unit and slave unit is correct, and whether other system slave unit communication is incorrectly connected to this system ;
2. Confirm that the actual number of outdoor unit in the system is correct, then power on again ;

VRF trouble shooting

XH4： There are 3 times P6 protection in 60 minutes

Solution： Refer to P6

H5： There are 3 times P2 protection in 60 minutes

Solution： Refer to P2

H6： There are 3 times P4 protection in 100 minutes

Solution： Refer to P4

H7： Indoor unit quantities decreasing malfunction over 3 minutes

Reason： Part of the indoor unit communication is lost

Solution：

1. Refer to the indoor unit error code FE&E1;

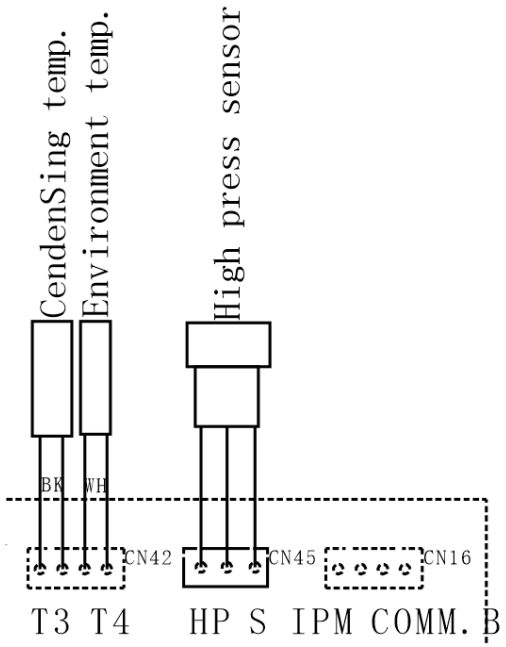
VRF trouble shooting

H8： Pressure sensor error

Reason： The main control board detects exhaust pressure ＜0.3MPa

Solution：

1. Check whether the pressure sensor is firmly connected, and confirm that the connection is secure ;
2. There is no problem with the above steps, replace the pressure sensor/main control board.



VRF trouble shooting

XH9： There are 3 times P9 protection in 30 minutes

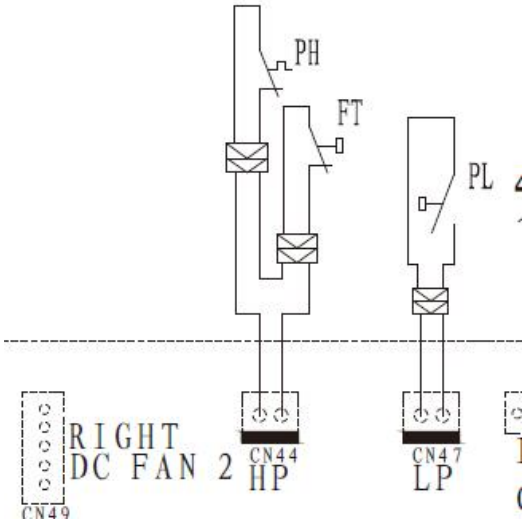
Solution： Refer to P9

P0： Reserved

VRF trouble shooting

P1： High pressure protection

Reason： The open circuit state is detected at the high pressure switch detection port



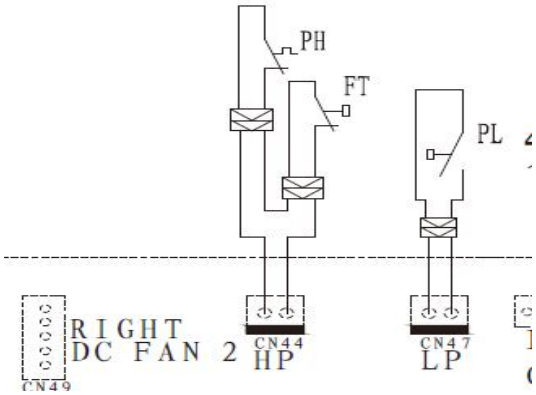
Solution：

1. Check whether the wiring of the high pressure switch is firm and confirm that the wiring is normal;
2. Check whether the condenser has poor heat dissipation and ensure that there is no problem with heat dissipation ;
3. Check parameter item 23/24 exhaust temperature to see if it is less than 120℃, if yes, short-circuit the exhaust thermostat, if the fault disappears, replace the exhaust thermostat; if the exhaust is ≥120℃, refer to P4 fault; otherwise Go to the next step ;
4. Connect the pressure gauge, run the unit, check the high and low pressure, if the pressure is normal, remove the pressure switch to measure the resistance, if it is infinite, replace the pressure switch; if the pressure switch resistance is 0, replace the main board ;
5. Connecting the pressure gauge to test, if the pressure of the pressure gauge is too high, it is the system Reason, and it is necessary to troubleshoot problems such as system blockage, vacuum, and excessive refrigerant;

VRF trouble shooting

P2： Low pressure protection

Reason： The open circuit state is detected at the low pressure switch detection port



Solution：

1. Check whether the wiring of the low pressure switch is firm and confirm that the wiring is normal ;
2. Check whether the evaporator has poor heat dissipation and ensure that there is no problem with heat dissipation ;
3. Connect the pressure gauge, run the unit, check the high and low pressure, if the pressure is normal, remove the pressure switch to measure the resistance, if it is infinite, replace the pressure switch; if the pressure switch resistance is 0, replace the main board ;
4. Connecting the pressure gauge to test, if the pressure of the pressure gauge is too low, it is the system Reason, and it is necessary to troubleshoot problems such as system blockage, leakage, and lack refrigerant;

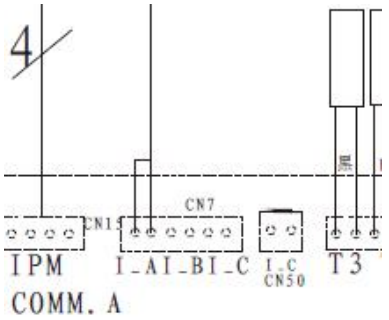
VRF trouble shooting

XP3： Inverter compressor over current protection

Reason： The main board detects that the operating current is too large

Solution：

1. Check whether the wiring of the motor and compressor is tight and confirm that the wiring is normal;
2. Check whether the current transformer is firmly connected ;
3. Use the clamp meter to check the primary side AC current and the secondary side compressor DC current, and check items 32/33/34/35, compare the difference between the check value and the clamp meter, if the difference is large, it means there is a problem with the current transformer or the main control board. Try to use a normal transformer, if not resolved, replace the main control board ;
4. If the difference between the clamp meter and the check value is not large, the compressor problem or the system problem.



VRF trouble shooting

P4： Discharge temperature sensor protection

Reason： Exhaust temperature sensor reads that the temperature is too high

Solution：

1. Connect a pressure gauge to measure whether the low pressure pressure is too low (normally 0.7-0.9MPa). If the pressure is too low, add refrigerant. At the same time, check whether the SV5 spray cooling valve on the main control board has output 220V before the failure. If there is no output, replace the main board. If the output valve does not act, replace the SV5 coil ;
2. Measure the resistance of the temperature sensor, If it is inaccurate, replace the sensor ;
3. If the temperature sensor reading is accurate, check the exhaust temperature of item 11 and compare it. If the temperature of the main control board is unreasonable, replace the main control board ;
4. If the above steps are normal, check whether the refrigerant system is normal, such as blockage of the air return pipe, poor evaporation, wear of the compressor, etc.

VRF trouble shooting

P5： Heat exchanger high temperature protection

Reason： The condenser temperature sensor reads that the temperature is too high

Solution:

1. Check whether the heat dissipation of the condenser is normal, to ensure that there is no dirty block, poor return air, etc.
2. Measure the resistance of the temperature sensor, If it is inaccurate, replace the sensor;
3. If the temperature sensor reading is accurate, Check the middle and outlet temperature of the condenser for items 8 & 9 and compare it,If the temperature of the main control board is unreasonable, replace the main control board.
4. The above steps are all normal, check whether the system is normal, such as the indoor unit load is too large, the vacuum problem.

VRF trouble shooting

XP6： IPM module protection

Reason： Compressor drive module abnormal

Solution：

1. Check whether the power supply is normal, the power supply phase voltage is 220-240V, and confirm that the power supply is normal;
2. Check whether the heat dissipation of the condenser is normal, to ensure that there is no dirty blockage, poor return air, etc.
3. Measure the resistance between compressor UWV (normally within 20Ω) and UVW resistance to ground (normally infinite, MΩ level), if the compressor resistance is abnormal, replace the compressor, otherwise proceed to the next step;
4. Check whether the module heat dissipation silicone grease is applied evenly and normally, if abnormal, apply silicone grease again, otherwise proceed to the next step;
5. The above steps are normal, then run the unit and observe whether the compressor is abnormal, such as abnormal noise, excessive current, etc., otherwise replace the compressor;
6. Observe whether the system has poor heat dissipation or module overheating and overcurrent caused by mixing with difficult-to-compress gas, otherwise replace the main control board;

VRF trouble shooting

P7： Insufficient exhaust gas overheat protection

Reason： Too much refrigerant in the system, liquid back in the compressor, problems with the refrigerant system

Solution：

1. Check whether the exhaust temperature sensor is inaccurate, replace it if it is inaccurate, otherwise it is a refrigerant system problem;
2. Connect the pressure gauge to check the high and low pressures, and check items 15/23/24 to see if there is too much refrigerant. If there is too much refrigerant, release the refrigerant;
3. Check whether the indoor unit is poorly evaporated and other problems.

VRF trouble shooting

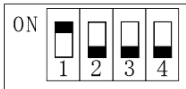
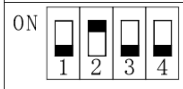
XP8： The outdoor unit capacity dial code does not match the compressor drive model protection

Reason： Dial code problem, fan module detection is abnormal

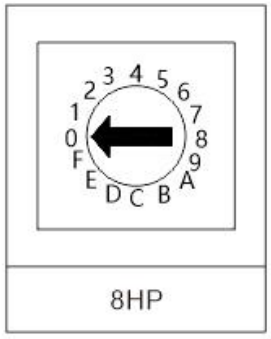
Solution：

1. Check whether the SW11 capability dialing code of the main control board is correct, correct it if it is incorrect;
2. Check whether the dialing code of the IPM module board is correct, correct it if it is incorrect;
3. After correcting the dialing code, power on again, if the problem is not resolved, replace the main control board.

DIP switch on IPM：

	8-18HP
	20-22HP
	24-32HP(IPM. A&B)

Sw11 setting for outdoor unit capacity:



8HP

Set	0	1	2	3	4	5	6	7	8	9
Capacity	8HP	10HP	12HP	14HP	16HP	18HP	20HP	22HP	24HP	26HP
Set	A	B	C	D	E	F				
Capacity	28HP	30HP	32HP	Reserved	Reserved	Reserved				

VRF trouble shooting

XP9: DC fan module protection

Reason： Fan drive module abnormal

Solution：

1. Check whether the power supply is normal, the power supply phase voltage is 220-240V, and confirm that the power supply is normal;
2. Check whether the input voltage of the rectifier bridge is 220V, if not, replace the filter board;
3. Check whether the output of the rectifier bridge is 310V, otherwise replace the rectifier bridge, if yes, proceed to the next step;
4. Check if the DC+/DC- of the fan module board is 310V, otherwise replace the filter board, if yes, proceed to the next step.

VRF trouble shooting

XP9: DC fan module protection

Reason: Fan drive module abnormal

Solution：

5. Check whether the FAN POWER interface of the main control board is DC12V, otherwise replace the main control board, if yes, proceed to the next step;
6. Check whether the communication line between the main control board and the fan module is firmly connected, whether it is open/short, otherwise replace the communication line and proceed to the next step normally;
7. Use a multimeter to measure the resistance between the UVW of the motor, whether it is open/short, within 20Ω; measure the resistance of UVW to ground, and it is normal infinity (MΩ level), otherwise the motor is damaged, replace the motor;

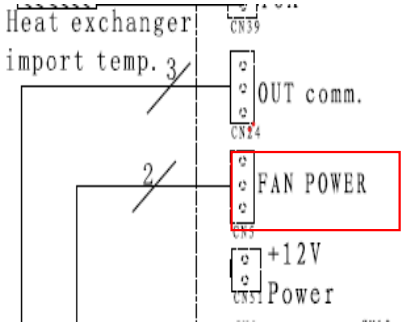
VRF trouble shooting

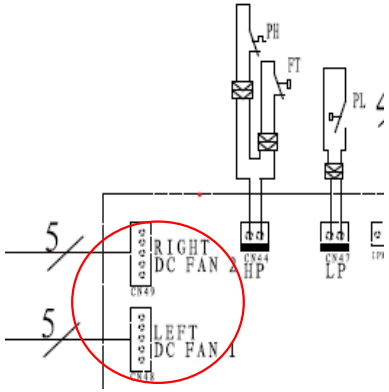
XP9: DC fan module protection

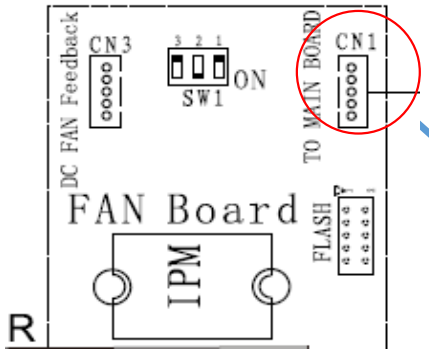
Reason: Fan drive module abnormal

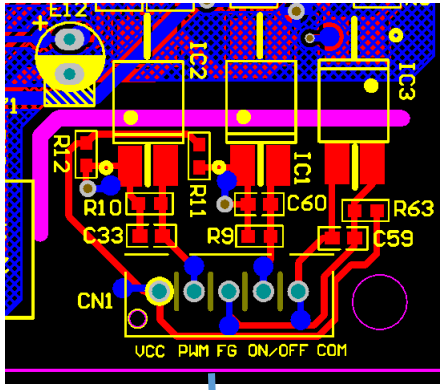
Solution:

8. Measure the voltage between VCC and COM, it is normally DC5V, otherwise replace the main control board;
9. Measure PWM-COM, DC0V is off, normal DC2.5V voltage fluctuates, otherwise replace the main control board;
10. If the voltages of VCC-COM and PWM-COM are normal, replace the module board. If it still cannot be solved, replace the motor.









Communication port with main board,
Power ground COM;
Fan start signal Ctrl;
0V start, 5V close;
Fan speed feedback FG.

VRF trouble shooting

XPA: Module temperature sensor over-temperature protection

Reason: IPM module board temperature is too high

Solution：

1. Check whether the heat dissipation of the condenser is normal, to ensure that there is no dirty block, short circuit of the return air, etc.
2. Check whether the module heat dissipation silicone grease is applied evenly and normally, if it is abnormal, apply silicone grease again, otherwise proceed to the next step;
3. Check whether the system has poor heat dissipation or module overheating and overcurrent caused by mixing with difficult-to-compress gas, otherwise replace the IPM module board;

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