MINI-SPLIT SYSTEMS SERVICE MANUAL
Indoor and Outdoor Unit Error Codes and Component Diagnostic

Corp1816-L7
10/2020
Supersedes 8/2018

MCFA and MCFB

MWMA, MWMB and 3WMB036

MPA, MPB and MLA Single Zone

MPA, MPB and MLA Multi-Zone

MMDA and MMDB

M22A, M33A and M33B

Table of Contents

WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.

Installation and service must be performed by a licensed professional HVAC installer (or equivalent) or service agency

1. Outdoor Unit Indicators and Controls

1.1. Multi-Zone Outdoor Unit Spot Check Function

There is a check switch on the outdoor control board. Push the switch labelled SW1 to check the status of unit when the unit is running. The two-digit display will provide the following status indicators (see table 1) each time the SW1 switch is pushed.

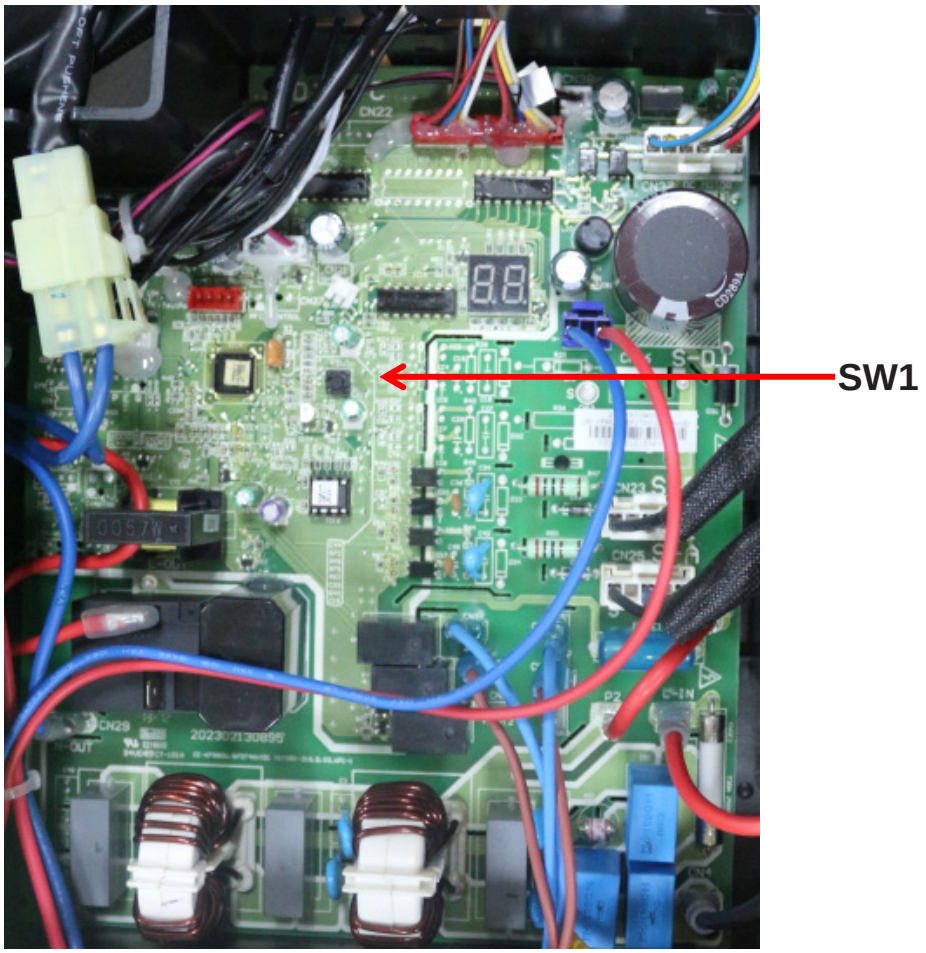


Figure 1. SW1 Location

Table 1. Status Indicators

	Display	Remark		
0	Normal Display	Display running frequency, running state or malfunction code		
1	Number of connected indoor units	Actual data		
			Display	Number of indoor units
			1	one
			2	two
			3	three
			4	four
			5	five
2	Outdoor unit running mode	Off: 0, Fan only: 1, Cooling: 2, Heating: 3, Forced cooling: 4		

Table 1. Status Indicators

	Display	Remark
3	Indoor unit A capacity	The capacity unit is horsepower. If the indoor unit is not connected, the digital display tube will show: "——" (9K:1HP,12K:1.2HP,18K:1.5HP)
4	Indoor unit B capacity	
5	Indoor unit C capacity	
6	Indoor unit D capacity	
7	Indoor unit E capacity	
8	Indoor unit A capacity demand code	Norm code*HP (9K:1HP,12K:1.2HP,18K:1.5HP)
9	Indoor unit B capacity demand code	
10	Indoor unit C capacity demand code	
11	Indoor unit D capacity demand code	
12	Indoor unit E capacity demand code	
13	Outdoor unit amendatory capacity demand code	Forced cooling:7
14	The frequency corresponding to the total indoor units amendatory capacity demand	
15	The frequency after the frequency limit	
16	The frequency sending to compressor control chip	
17	Indoor unit A evaporator outlet temp.(T2BA)	• If the temperature is lower than -9 degrees, the two-digit display will show "-9". • If the temperature is higher than 70 degree, the two-digit display will show "70". • If the indoor unit is not connected, the two-digit display will show: "——"
18	Indoor unit B evaporator outlet temp.(T2BB)	
19	Indoor unit C evaporator outlet temp.(T2BC)	
20	Indoor unit D evaporator outlet temp.(T2BD)	
21	Indoor unit E evaporator outlet temp.(T2BE)	
22	Indoor unit A room temp.(T1A)	• If the temperature is lower than 0 degree, the two-digit display will show "0". • If the temperature is higher than 50 degree, the two-digit display will show "50". • If the indoor unit is not connected, the two-digit display will show: "——"
23	Indoor unit B room temp.(T1B)	
24	Indoor unit C room temp.(T1C)	
25	Indoor unit D room temp.(T1D)	
26	Indoor unit E room temp.(T1E)	
27	Indoor unit A evaporator temp.(T2A)	• If the temperature is lower than -9 degree, the two-digit display will show "-9". • If the temperature is higher than 70 degree, the two-digit display will show "70". • If the indoor unit is not connected, the digital display tube will show: "——"
28	Indoor unit B evaporator temp.(T2B)	
29	Indoor unit C evaporator temp.(T2C)	
30	Indoor unit D evaporator temp.(T2D)	
31	Indoor unit E evaporator temp.(T2E)	
32	Condenser pipe temp.(T3)	
33	Outdoor ambient temp.(T4)	
34	Compressor discharge temp.(TP)	• The display value should be between 30 and 129 degrees. • If the temperature is lower than 30 degree, the two-digit display will show "30". • If the temperature is higher than 99 degree, the two-digit display will show single digit and tens digit. ***NOTE:*** *For example, the two-digit display show "0.5",it means the compressor discharge temp. is 105 degree.)*
35	AD value of current	The display value is hex number. ***NOTE:*** *For example ,the two-digit display show "Cd", it means AD value is 205.*
36	AD value of voltage	
37	EXV open angle for indoor unit A	• Actual data/4. • If the value is higher than 99, the two-digit display will show single digit and tens digit. ***NOTE:*** *For example ,the two-digit display show "2.0",it means the EXV open angle is 120×4=480p.)*
38	EXV open angle for indoor unit B	
39	EXV open angle for indoor unit C	
40	EXV open angle for indoor unit D	
41	EXV open angle for indoor unit E	

Table 1. Status Indicators

	Display	Remark		
42	Frequency limit symbol	Bit7	Frequency limit caused by IGBT radiator	The display value is a hex number. ***NOTE:*** *For example, the digital display tube shows 2A,then Bit5=1, Bit3=1, Bit1=1.* It means frequency limit caused by T4, T3 and current.
		Bit6	Frequency limit caused by PFC	
		Bit5	Frequency limit caused by T4.	
		Bit4	Frequency limit caused by T2.	
		Bit3	Frequency limit caused by T3.	
		Bit2	Frequency limit caused by T5.	
		Bit1	Frequency limit caused by current	
		Bit0	Frequency limit caused by voltage	
43	Average value of T2	(Sum T2 value of all indoor units)/(number of indoor units in good connection)		
44	Outdoor unit fan motor state	Off:0, High speed:1, Med speed:2, Low speed:3 Breeze:4, Super breeze:5		
45	The last error or protection code	00 means no malfunction and protection		
46	Indoor unit F capacity	Not used		
47	Indoor unit F capacity demand code	Not used		
48	Indoor unit F evaporator outlet temp.(T2BF)	Not used		
49	Indoor unit F room temp.(T1F)	Not used		
50	Indoor unit F evaporator temp.(T2F)	Not used		
51	EXV open angle for F indoor unit	Not used		

1.2. Multi-Zone Outdoor Digital Display

There is a two-digit display on the outdoor unit control board. The following are the code descriptions:

Table 2. Multi-Zone Outdoor Unit Error Codes

Display Code	Description
	In protection or malfunction, the LED displays error code or protection code.
	In compressor operation, the LED display the running frequency,
--	Outdoor unit - standby mode for single zone. The LED displays “- -”
--	Multi zone mode conflict - - (dash dash) indoor display or operation lamp Flashes 6 times, timer lamp Flashing, - - display
dF	In defrosting mode, the LED displays “dF” or alternative displays between running frequency and “dF”(each displays 0.5s)
PH	In compressor pre-heating, The LED displays “PH” or alternative displays between running frequency and “PH”(each displays 0.5s)
RO	During the oil return process, The LED displays “RO” or alternative displays between running frequency and “RO”(each displays 0.5s)
LC	In low ambient cooling mode, the LED displays “LC” or alternative displays between running frequency and “LC”(each displays 0.5s)
FC	In forced cooling mode, the LED displays “FC” or alternative displays between running frequency and “FC”(each displays 0.5s)
E6	When PFC module protection occurs three times within 15 minutes, the LED displays “E6” or alternative displays between running frequency and “E6”(each displays 0.5s)
CP	When the LED displays CP, this indicates the J1 jumper removed or loose or the remote on / off switch is activated.
CL	When the LED displays CL, this is a reminder to check and clean the air filter.
NF	When the LED displays NF, this indicates 2880 hour filter replacement reminder. To clear press the LED button 5 times within 15 seconds when the CL or NF shows to reset and clear code.
CF	CF anti-cold blow. Fan will stay Off on call for heat unit indoor coil warms up to 90°F or above.
FP	Freeze protection. The silence (FP) button was pushed and held for more than three seconds. Temperature will hold at 46°F until returned to normal operation.

1.3. Multi-Zone Error Codes

Table 3. Multi-Zone Outdoor / Indoor Unit Error Codes Matches

Display	LED Status	New Indoor Error
E0	Outdoor unit EEPROM parameter error	F4
E2	Communication malfunction between indoor and outdoor units	E1
E3	Communication malfunction between IPM board and outdoor main control board	——
E4	Outdoor temperature sensor (coil sensor T3,ambient sensor T4, Compressor discharge sensor T5 indoor coil outlet pipe sensor T2B) malfunction	F2/F1/F3/F6
E5	Over-voltage or under-voltage protection	P1
E6	PFC module protection	——
E8	Outdoor fan speed malfunction	F5
F1	No. A Indoor unit coil outlet temperature sensor malfunction	——
F2	No. B Indoor unit coil outlet temperature sensor malfunction	——
F3	No. C Indoor unit coil outlet temperature sensor malfunction	——
F4	No. D Indoor unit coil outlet temperature sensor malfunction	——
F5	No. E Indoor unit coil outlet temperature sensor malfunction	——
F6	No. F Indoor unit coil outlet temperature sensor malfunction	——
P1	High pressure protection	P6
P2	Low pressure protection	P6
P3	Current overload protection	F0
P4	Temperature protection of compressor discharge	——
P5	Condenser high temperature protection	——
P6	Inverter module (IPM) malfunction	P0
LP	Low ambient temperature protection	——

Table 4. Multi-Zone Indoor Unit Error Codes

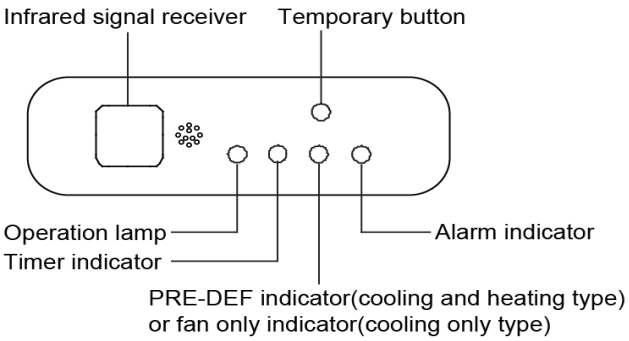
Display	Error Description
E0	Outdoor unit EEPROM error.
E2	Communication error between outdoor unit and all indoor units.
E3	Communication error between outdoor unit main control and IPM control.
E4	Temperature sensor error (outdoor coil, outdoor ambient , compressor discharge and indoor unit coil outlet temperature sensors.
E5	High and low voltage protection.
E8	Outdoor DC fan speed error.
F1	Indoor unit #1 coil outlet temperature sensor error.
F2	Indoor unit #2 coil outlet temperature sensor error.
F3	Indoor unit #3 coil outlet temperature sensor error.
F4	Indoor unit #4 coil outlet temperature sensor error.
F5	Indoor unit #5 coil outlet temperature sensor error.
F6	Indoor unit #6 coil outlet temperature sensor error.
P1	High pressure switch open
P2	Low pressure switch open
P3	Outdoor compressor current overload sensed.
P4	High temperature sensed at compressor discharge line.
P5	High temperature sensed at outdoor coil.
P6	Inverter module (IPM) error.

2. Indoor Unit Indicators and Controls

For a list of applicable error codes for the indoor units, refer to “3. Single Zone - Indoor and Outdoor Error Codes” on page 9. All indoor units provide error code information with either a digital LED display or with Flash codes.

2.1. Cassette Unit Display (M22A, M33A & M33B)

M0STAT62Q-1



M0STAT63Q-1

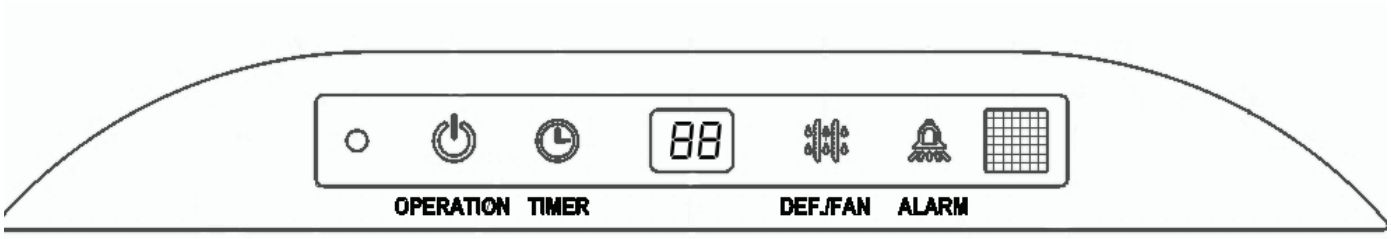


Table 5. Cassette Displays

2.2. Ducted Unit Display (MMDA & MMDB)

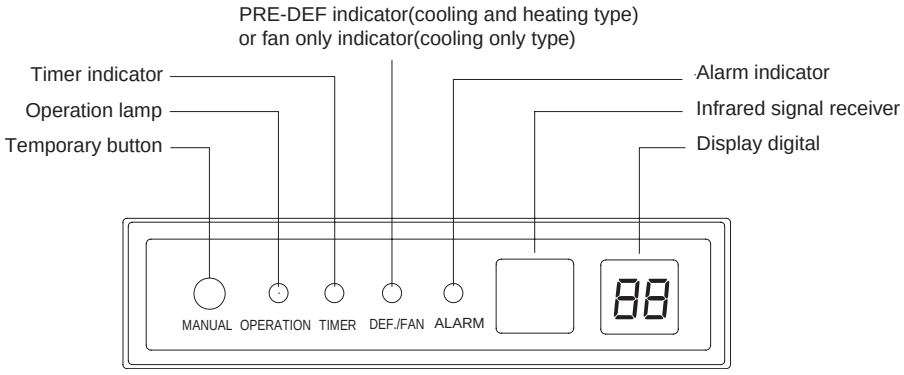


Figure 2. Ducted Unit Display

Wall-Mounted (MWMA, MWMB & 3WMB) and Ceiling/Floor (MCFA & MCFB) Unit Displays

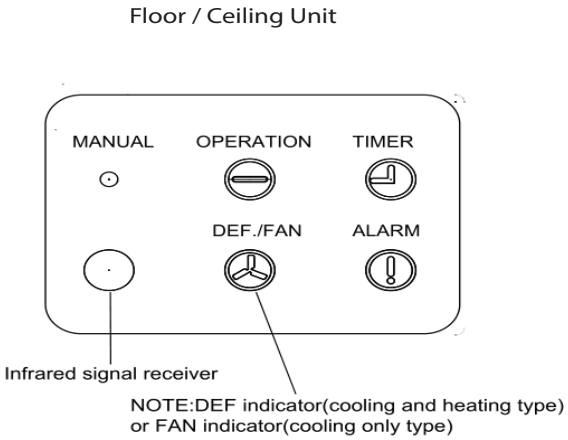


Figure 3. Wall-Mounted Unit Display

3. Single Zone - Indoor and Outdoor Error Codes

Table 6. Single-Zone 009/012 115VAC/208-230VAC

LED Display (LED 1: Blue/Red)	Error Description
Slow Flash	Standby
On	Normal operation
Flash Flash	Outdoor unit error.
Slow Flash -- Flashing at 1Hz. Flash Flash - Flashing at 2Hz.	

Table 7. Single-Zone 018/030 208-230VAC

Main Control	IPM Control (comp. driver)		Error Description
Blue or Yellow LED	Red LED	Green LED	
Slow Flash	Off	ON	Stand-by
ON	ON	Off	Normal operation
Flash Flash	Off	ON	Could be one of the following: • Indoor and outdoor unit communication error. • Outdoor unit temperature sensor error. • Outdoor unit EEPROM error • Compressor top temperature switch is open.
Flash Flash	ON	ON	DC bus voltage is too high or to low protection.
Flash Flash	Flash Flash	ON	Driver EEPROM error.
Flash Flash	Flash Flash	Off	Driver chip start-up failure.
Flash Flash	ON	Flash Flash	Could be one of the following: • Driver phase loss protection • Driver zero speed protection • PWM synchronization failure.
Flash Flash	Off	Flash Flash	IGBT over-current or IPM over-current
Flash Flash	Flash Flash	Flash Flash	Control chip communication error.
Slow Flash - Flashing at 1Hz and Flash Flash- Flashing at 2Hz			

Table 8. Indoor Unit Fault Codes (09K through 36K Wall-Mounted Units)

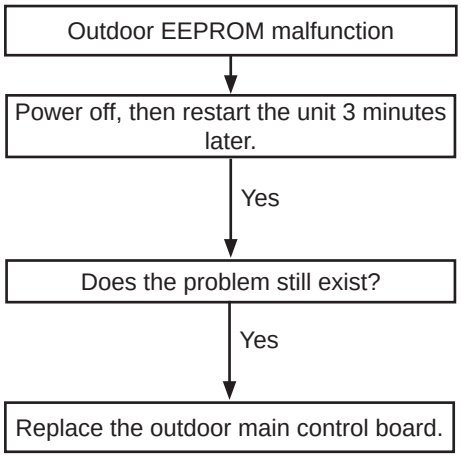
Running Light Short Flashes	State of Timer Light	Display	Description
1 time	Off	E0	Indoor unit EEPROM error
2 times	Off	E1	Communication error between indoor and outdoor units (E2 for outdoor code)
4 times	Off	E3	Indoor fan speed error
5 times	Off	E4	Indoor return air temperature sensor error
6 times	Off	E5	Indoor coil temperature sensor error
7 times	Off	EC	Low refrigerant
8 times	Off	EE	High water level alarm.
1 time	ON	F0	Outdoor current overload sensed. Note: (outdoor unit display --) two dashes
2 times	ON	F1	Outdoor ambient temperature sensor error (T4 malfunction) outdoor unit display E4
3 times	ON	F2	Outdoor coil temperature sensor error (T3) Malfunction outdoor unit display E4
4 times	ON	F3	Compressor discharge temperature sensor error (T5) Malfunction outdoor unit display E4
5 times	ON	F4	Outdoor unit EEPROM error - outdoor display E0
6 times	ON	F5	Outdoor unit fan speed error - outdoor Error display E8
1 time	Flash	P0	Inverter module IPM error - outdoor display P6
2 times	Flash	P1	High or low voltage protection - outdoor display E5
4 times	Flash	P3	Outdoor unit low temperature lockout - outdoor unit display LP
5 times	Flash	P4	Compressor drive error
6 times	Flash	--	Mode conflict
7 times	Flash	P6	Multi-Zone compressor high- or low-pressure switch open - outdoor unit display P2

Table 9. Indoor Unit Fault Codes (09K through 48K Cassette, Ducted and Ceiling/Floor Units)

Running Light Short Flashes	State of Timer Light	Display	Description
1 time	Off	E0	Indoor unit EEPROM error
2 times	Off	E1	Communication error between indoor and outdoor units (E2 for outdoor code)
4 times	Off	E3	Indoor fan speed error
5 times	Off	E4	Indoor return air temperature sensor error
6 times	Off	E5	Indoor coil temperature sensor error
7 times	Off	EC	Low refrigerant
8 times	Off	EE	High water level alarm (ducted and cassette units with factory pumps)
1 time	ON	F0	Outdoor current overload sensed Note: (outdoor unit display --) two dashes
2 times	ON	F1	Outdoor ambient temperature sensor error (T4 malfunction) outdoor unit display E4
3 times	ON	F2	Outdoor coil temperature sensor error (T3) Malfunction outdoor unit display E4
4 times	ON	F3	Compressor discharge temperature sensor error (T5) Malfunction outdoor unit display E4
5 times	ON	F4	Outdoor unit EEPROM error - outdoor display E0
6 times	ON	F5	Outdoor unit fan speed error - outdoor Error display E8
1 time	Flash	P0	Inverter module IPM error - outdoor display P6
2 times	Flash	P1	High or low voltage protection - outdoor display E5
4 times	Flash	P3	Outdoor unit low temperature lockout - outdoor unit display LP
5 times	Flash	P4	Compressor drive error
7 times	Flash	P6	Mode conflict
8 times	Flash	P7	Multi-Zone compressor high- or low-pressure switch open - outdoor unit display P2

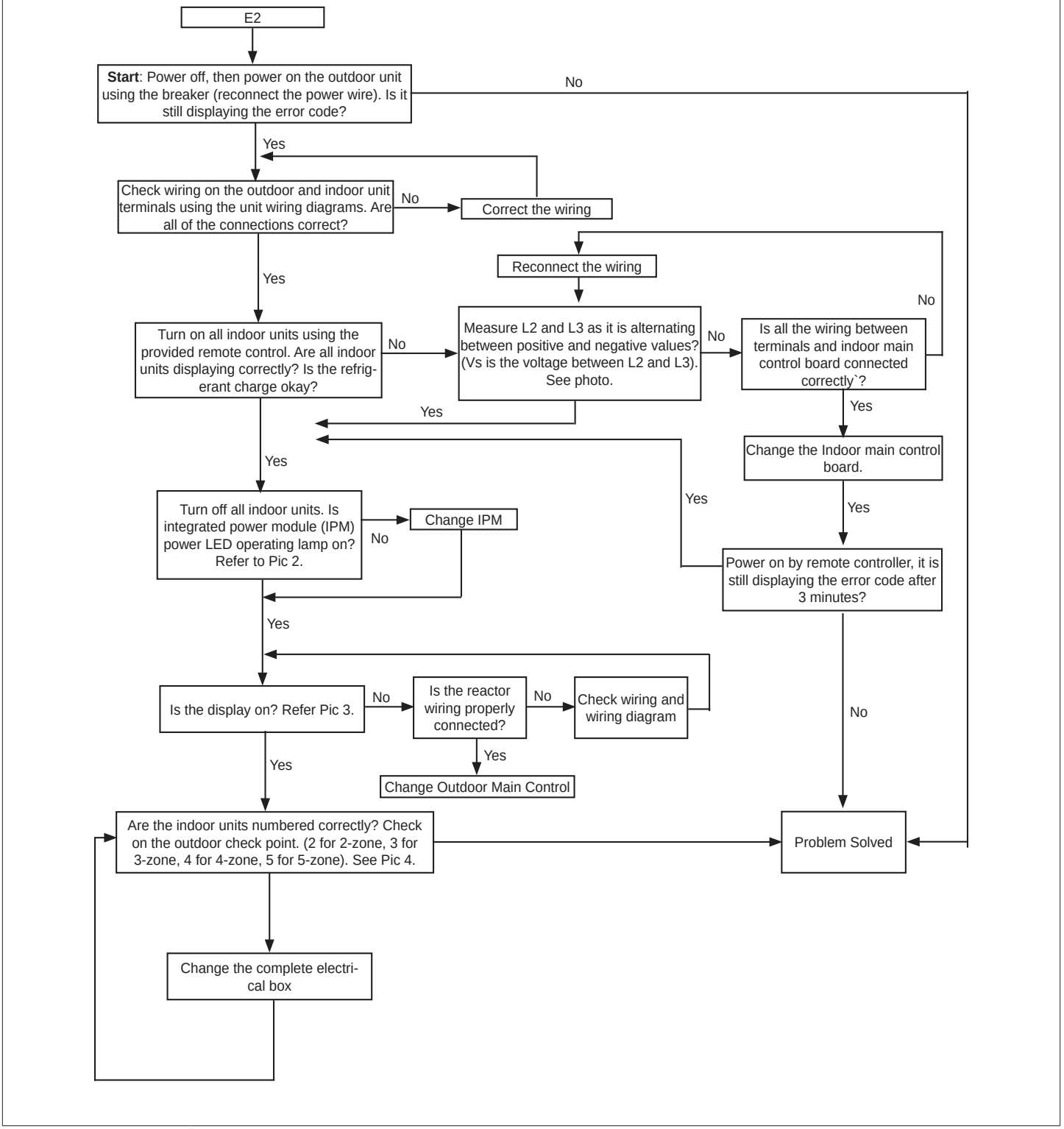
4. Extended Reference Guide - Outdoor Unit Error Codes

4.1. Error Code: E0

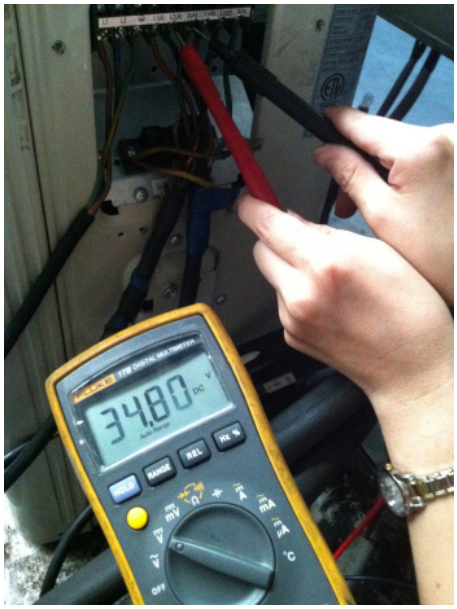
Description:	Outdoor EEPROM malfunction.
General Note:	Outdoor unit main control board chip is not receiving feedback from EEPROM chip.
	

4.2. Error Code: E1 / E2

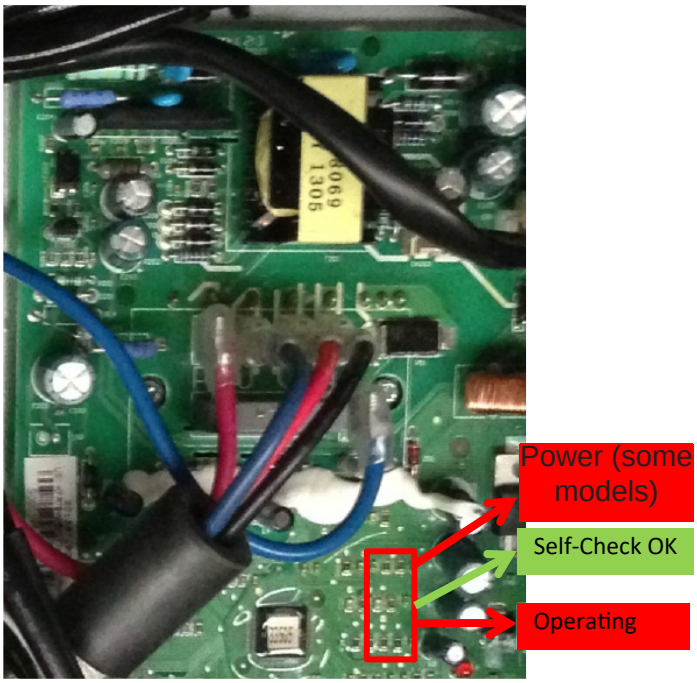
Description:	Communication malfunction between outdoor unit and all indoor units.
General Note:	Indoor unit is not receiving communication from outdoor unit for 120 seconds, or outdoor unit has not receive communication from any indoor units for 180 seconds.



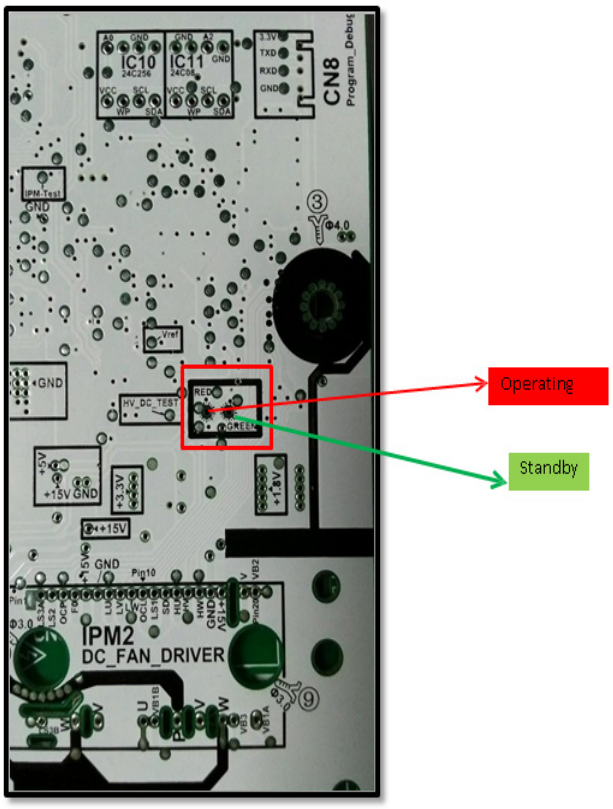
Error Code: E2 (continued)



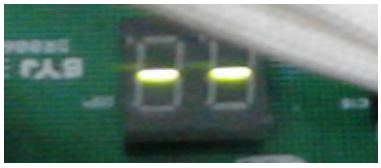
- Use a multimeter to test the DC voltage between L2 and L3 ports of the outdoor unit. The red pin of multimeter connects to the L2 port while the black pin connects to the L3 port.
- If the unit is running normally, the voltage will move alternately between positive and negative values.
- If the voltage is positive then check the outdoor unit main control.
- If the voltage is negative then check indoor unit main control.



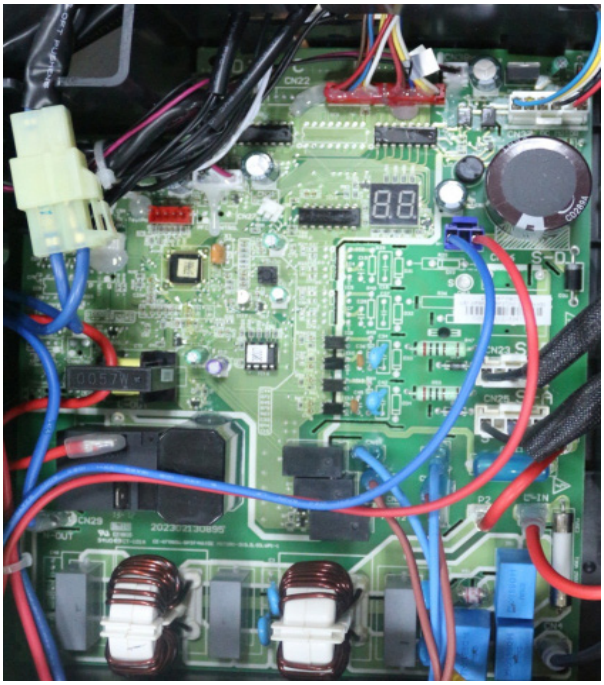
Error Code: E2 (continued)



Integrated Power Module (IPM) for 2- and 3-zones units.



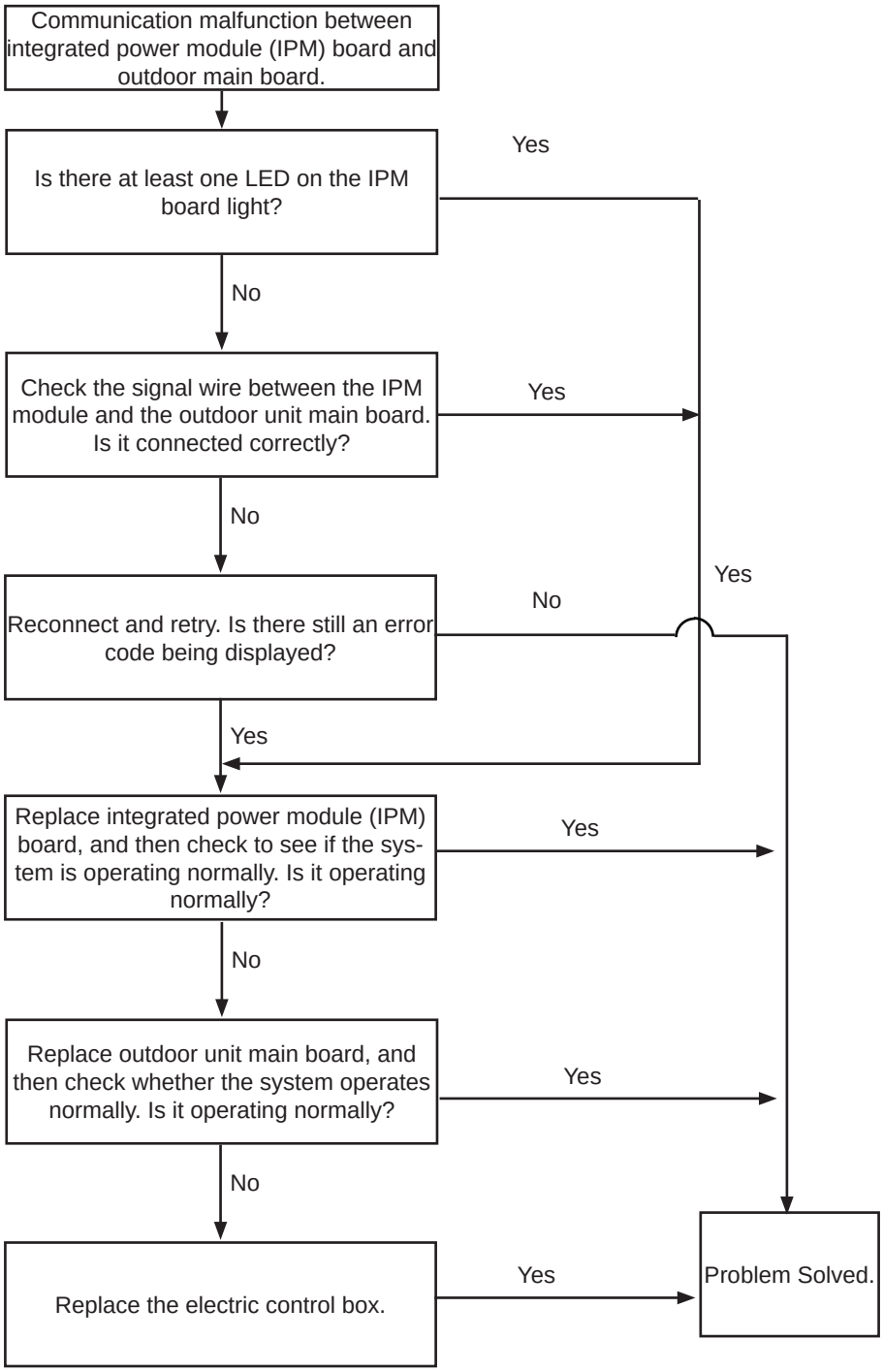
Main board LED when power is on and unit in standby mode with no error codes.



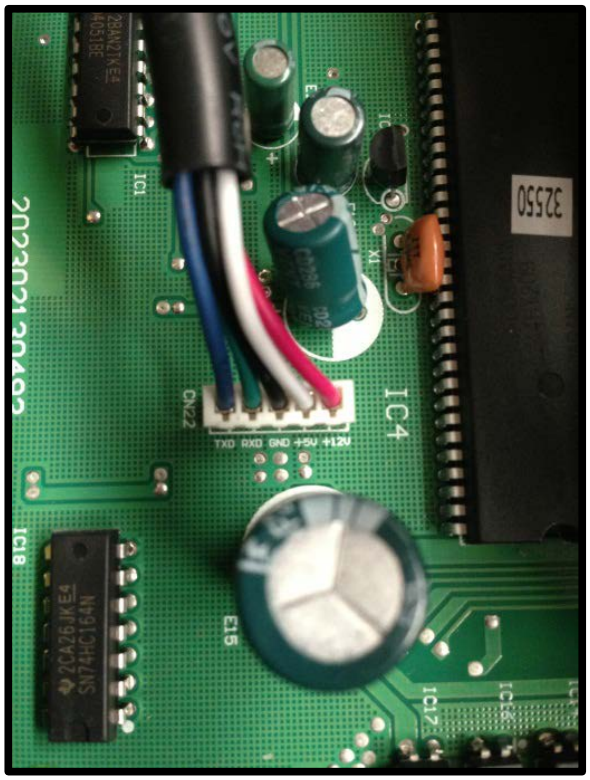
Check point button, press once to verify the number of indoor units are connected.

4.3. Error Code: E3

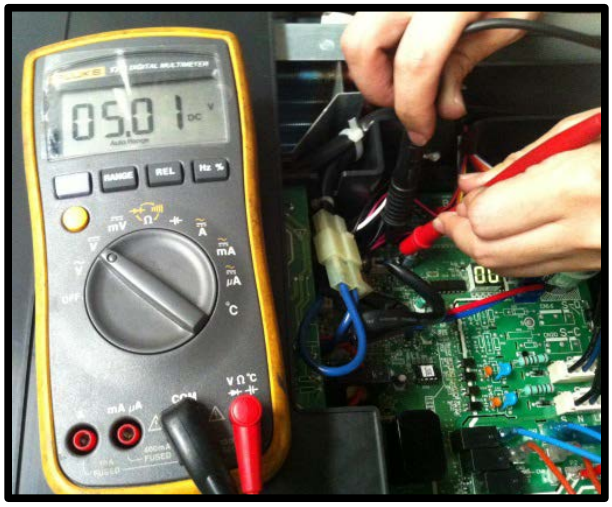
Description:	Communication error between outdoor unit main control and integrated power module (IPM).
General Note:	The main outdoor control board chip is not receiving feedback from integrated power module for a duration of 60 seconds.

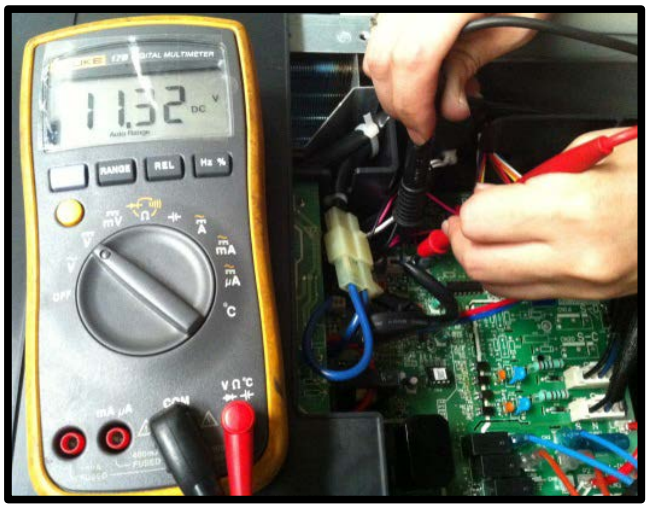


Error Code:	E3 (continued)



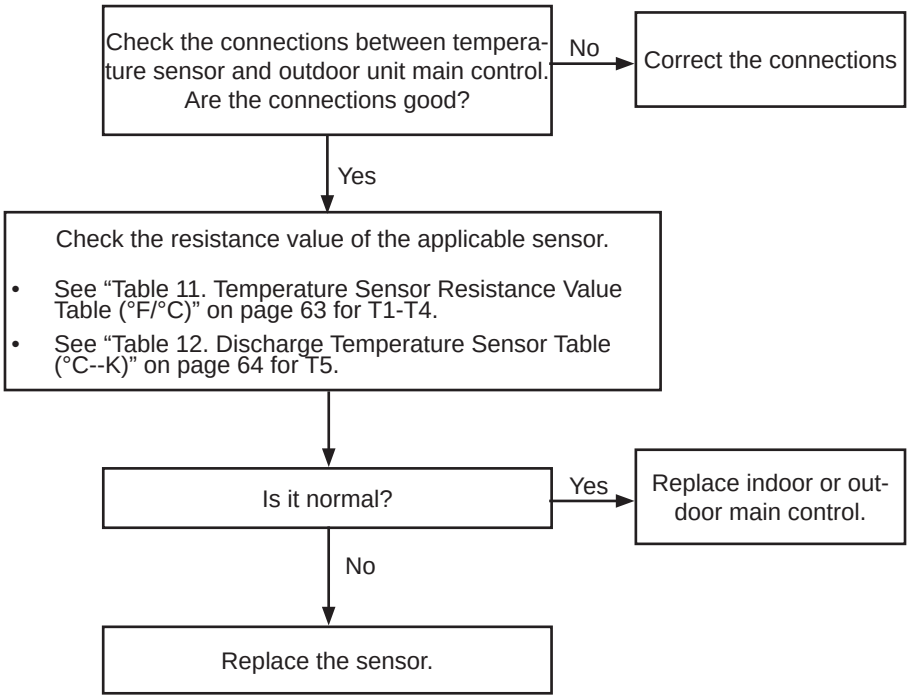
NOTE - Use a multimeter to test the DC voltage between black pin and white pin of signal wire The normal value should be around 5V.
Use a multimeter to test the DC voltage between black pin and red pin of signal wire. The normal value should be around 12V.

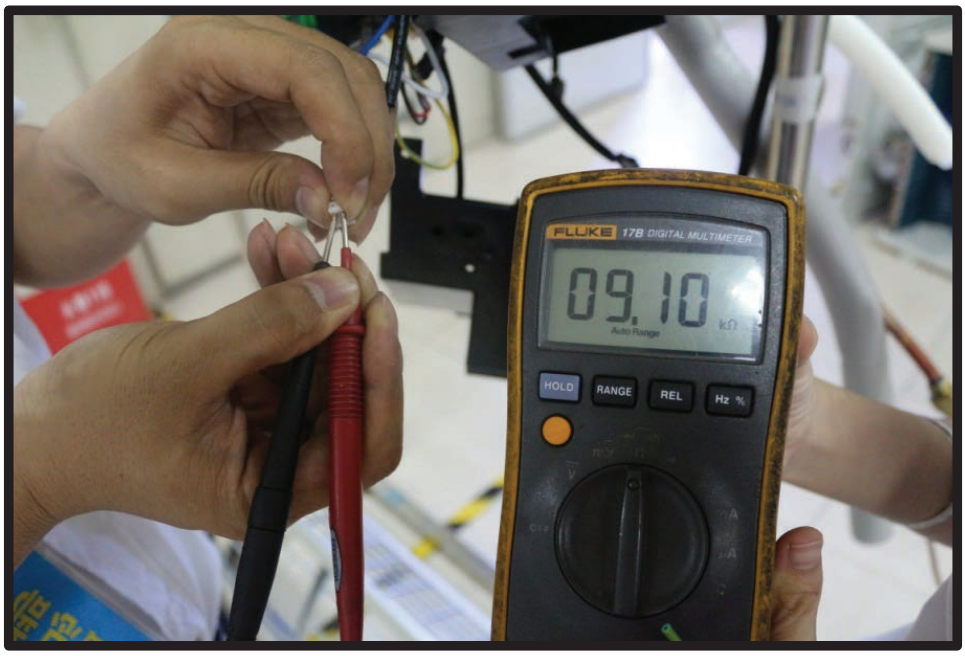




4.4. Error Codes: E4, F1, F2 and F3

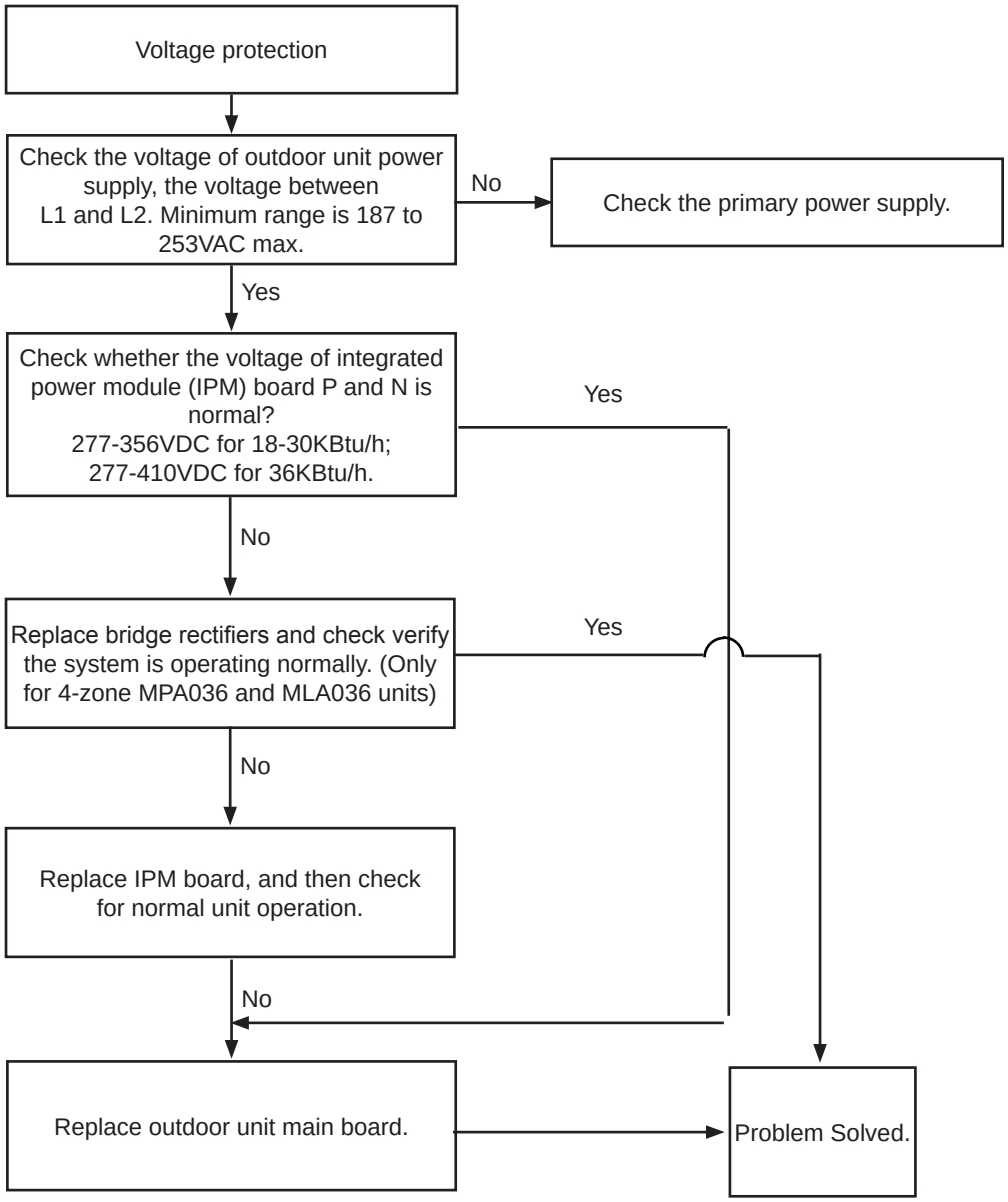
Description:	Temperature sensor error: T2 indoor unit coil outlet temperature sensor T3 outdoor coil sensor T4 outdoor ambient sensor T5 compressor discharge sensor
General Note:	Error displays if voltage is lower than 0.06V or higher than 4.94V.



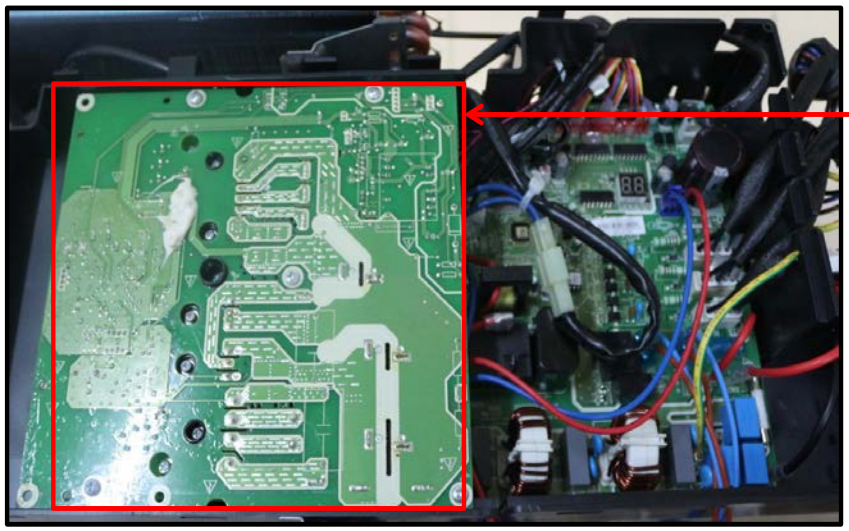


4.5. Error Code: E5

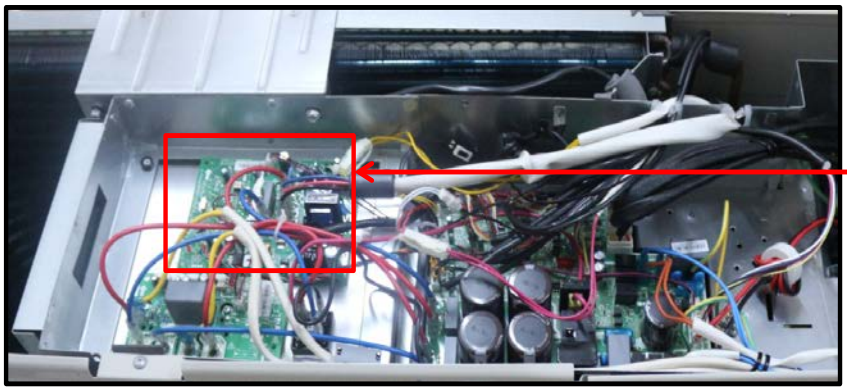
Description:	High or low voltage protection active.
General Note:	Either an abnormal voltage rise or drop is detected. Check the specified voltage detection circuit.



Error Code:	E5 (continued)



IPM (for 2-zone and 3-zone)



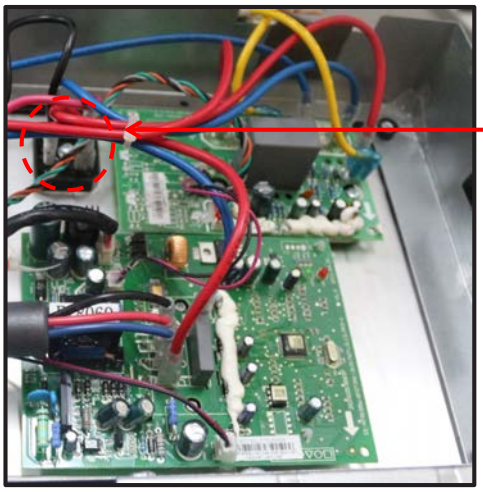
IPM (for 4-zone)

P-N (for 2-zone and 3-zone)

Error Code:	E5 (continued)

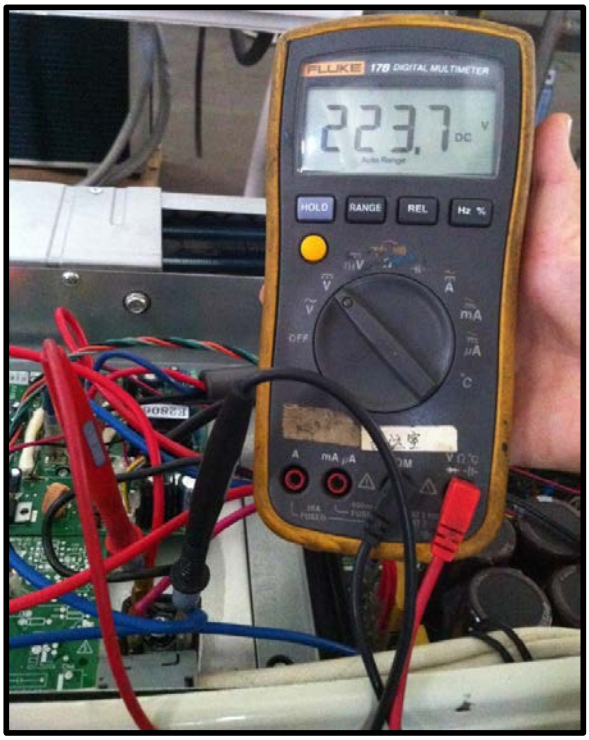
P-N (for 4-zone)

Bridge rectifier for 2-zone and 3-zone



Bridge rectifier for 4-zone

Error Code:	E5 (continued)



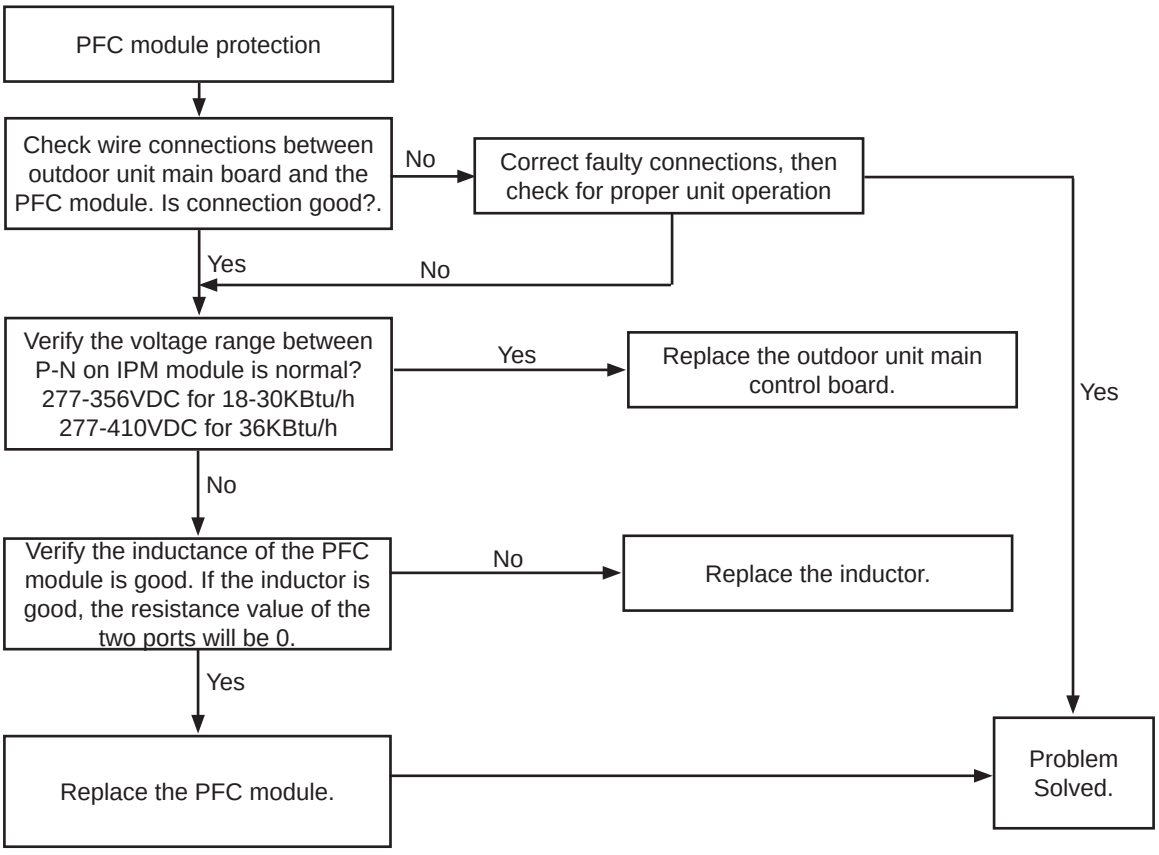
Remark:

Measure the DC voltage between + and - port on the bridge rectifier.

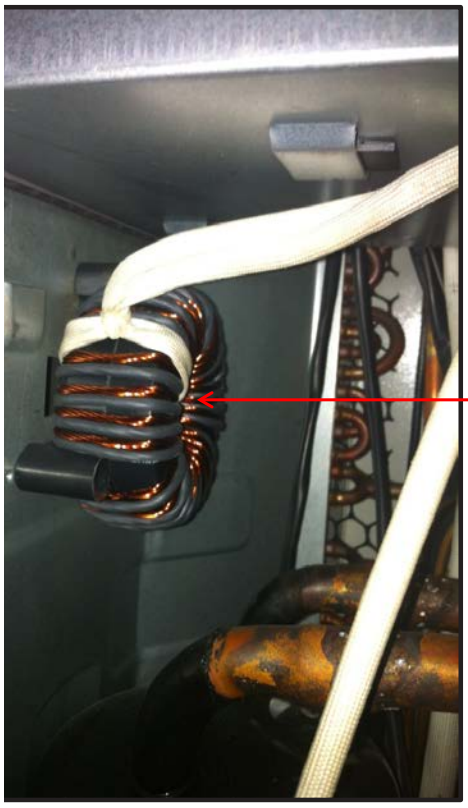
The normal value should be 190V~250V.

4.6. Error Code: E6

Description:	Power Factor Correction (PFC) module protection (MPA036S4M-1P and MPA048S4M-1P only)
General Note:	When the voltage signal sent by the PFC to the main outdoor unit control board is abnormal, the display LED will show “E6” and unit will turn off.

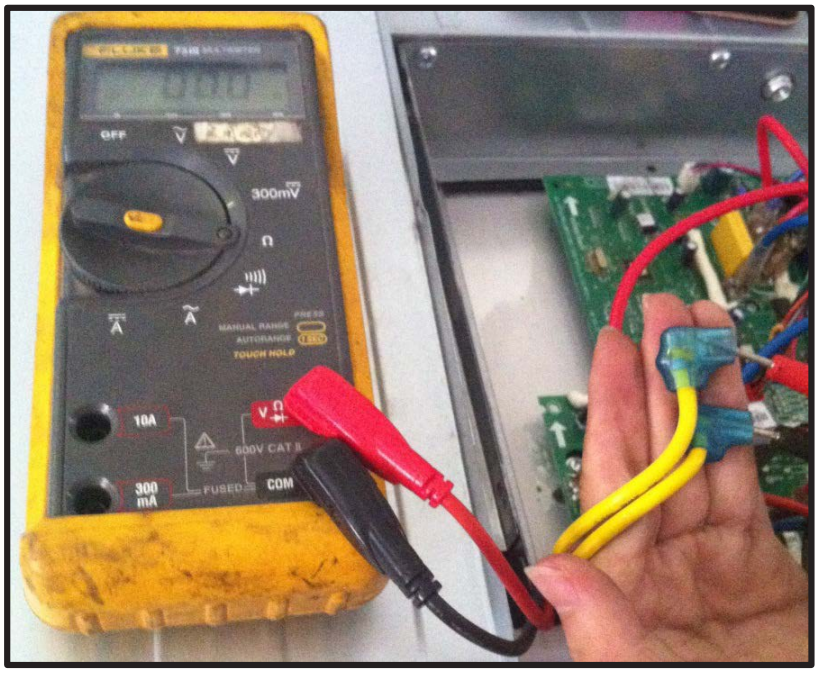


Error Code:	E6 (continued)



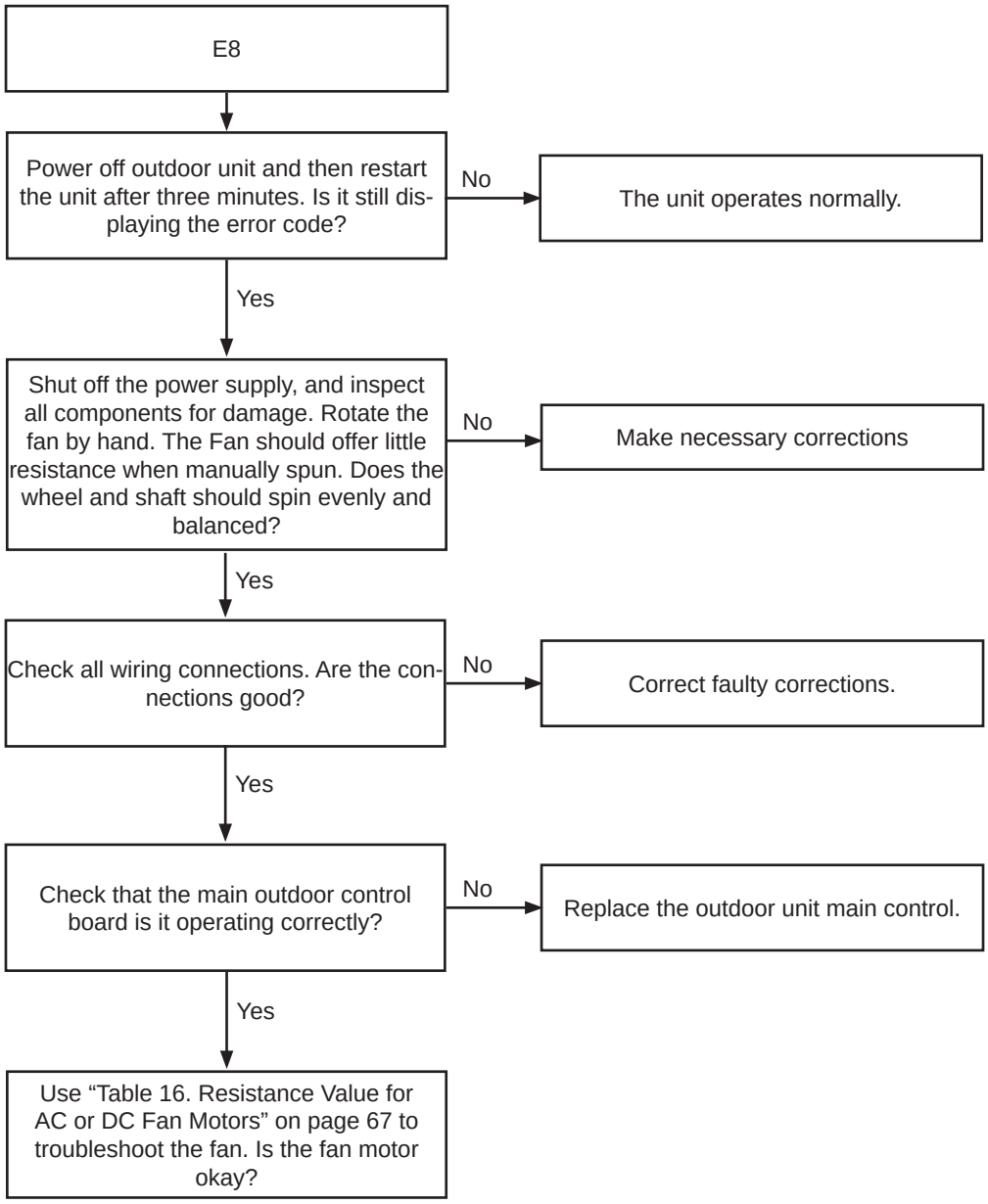
Inductor

Two terminals of the inductor



4.7. Error Code: E8

Description:	Outdoor DC fan motor speed error.
General Note:	When outdoor fan speed is too low (300 RPM) or too high (2400 RPM) for a specific time duration, the unit will stop and the LED will display the failure.



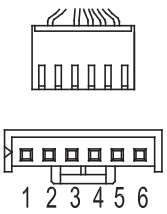
Error Code:	E8 (continued)

NOTE: *DC fan motor(control chip is inside fan motor)*

Power on and while the unit is in standby, measure the voltage between pins 1 and 3. Also measure the voltage between pin 3 and 4 at fan motor connector.

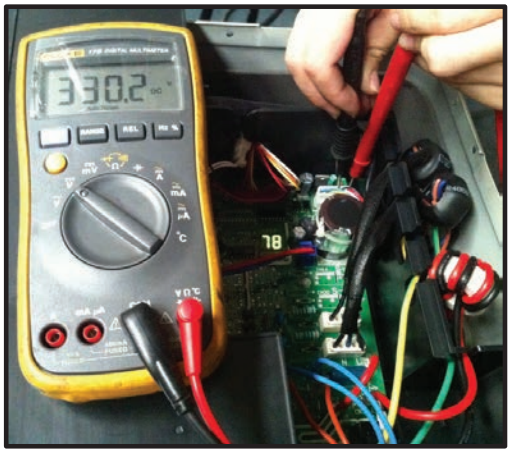
If the value of the voltage is not in the range as shown in the below table, the outdoor unit main control board is faulty and should be replaced.

Table 10. DC Motor Voltage Input and Output

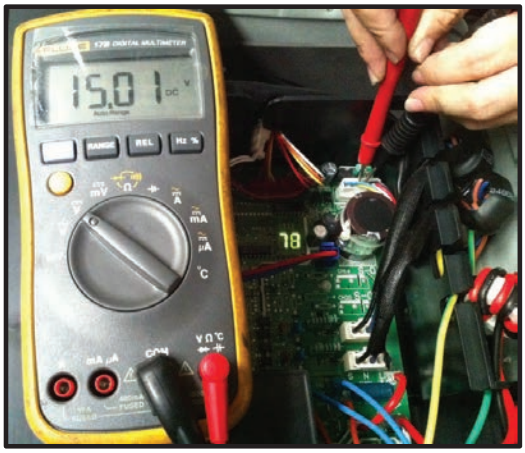


No.	Color	Signal	Voltage
1	Red	Vs/Vm	200~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5~16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5~16.5V

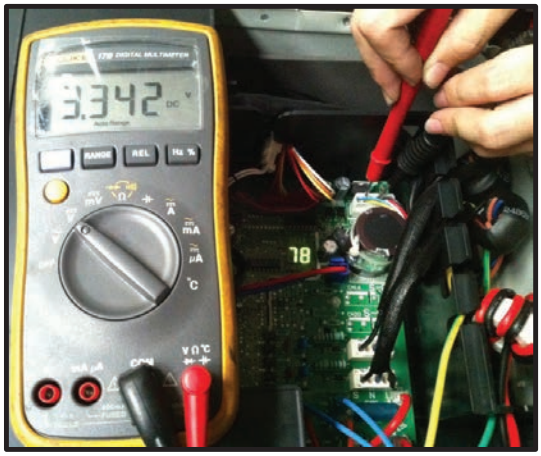
Vs



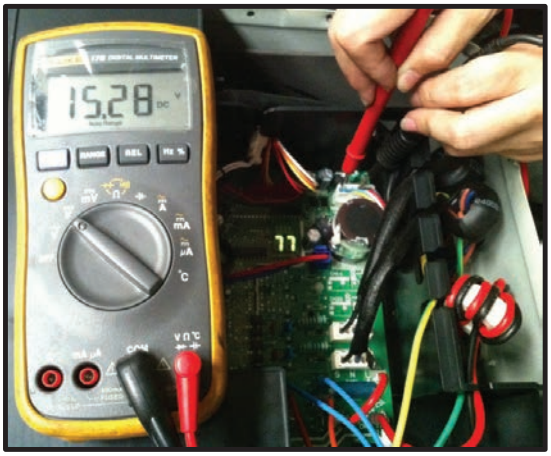
Vcc



Vsp

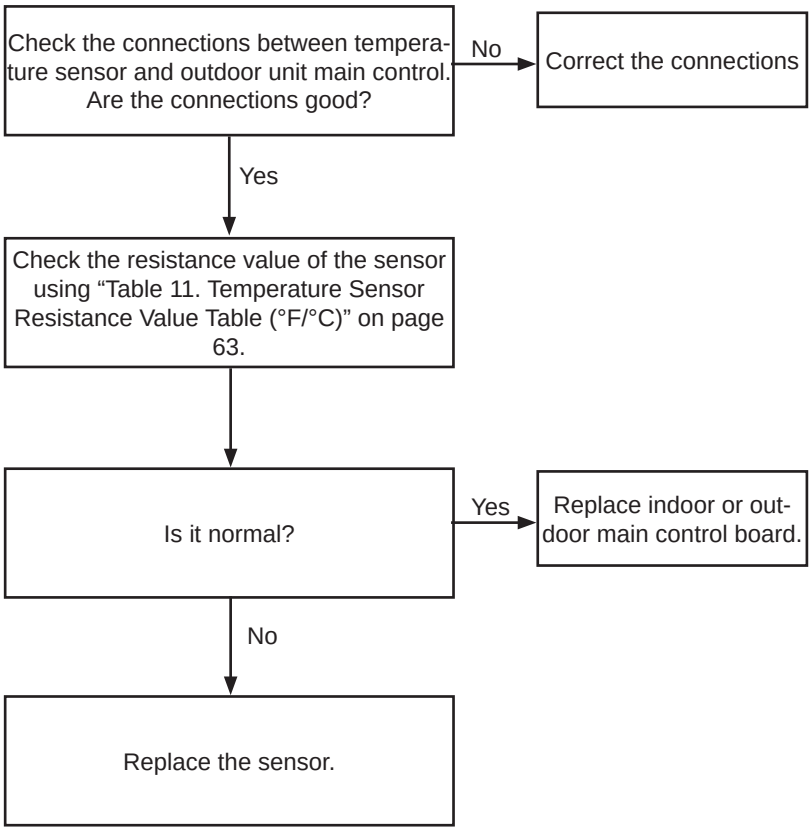


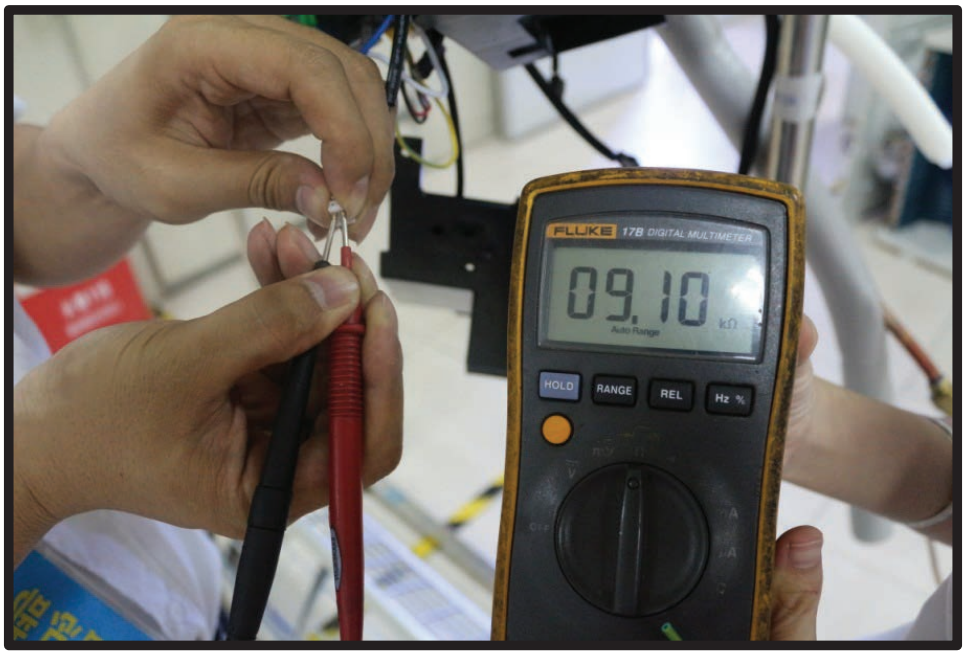
FG



4.8. Error Codes: F1, F2, F3, F4 , F5 and F6

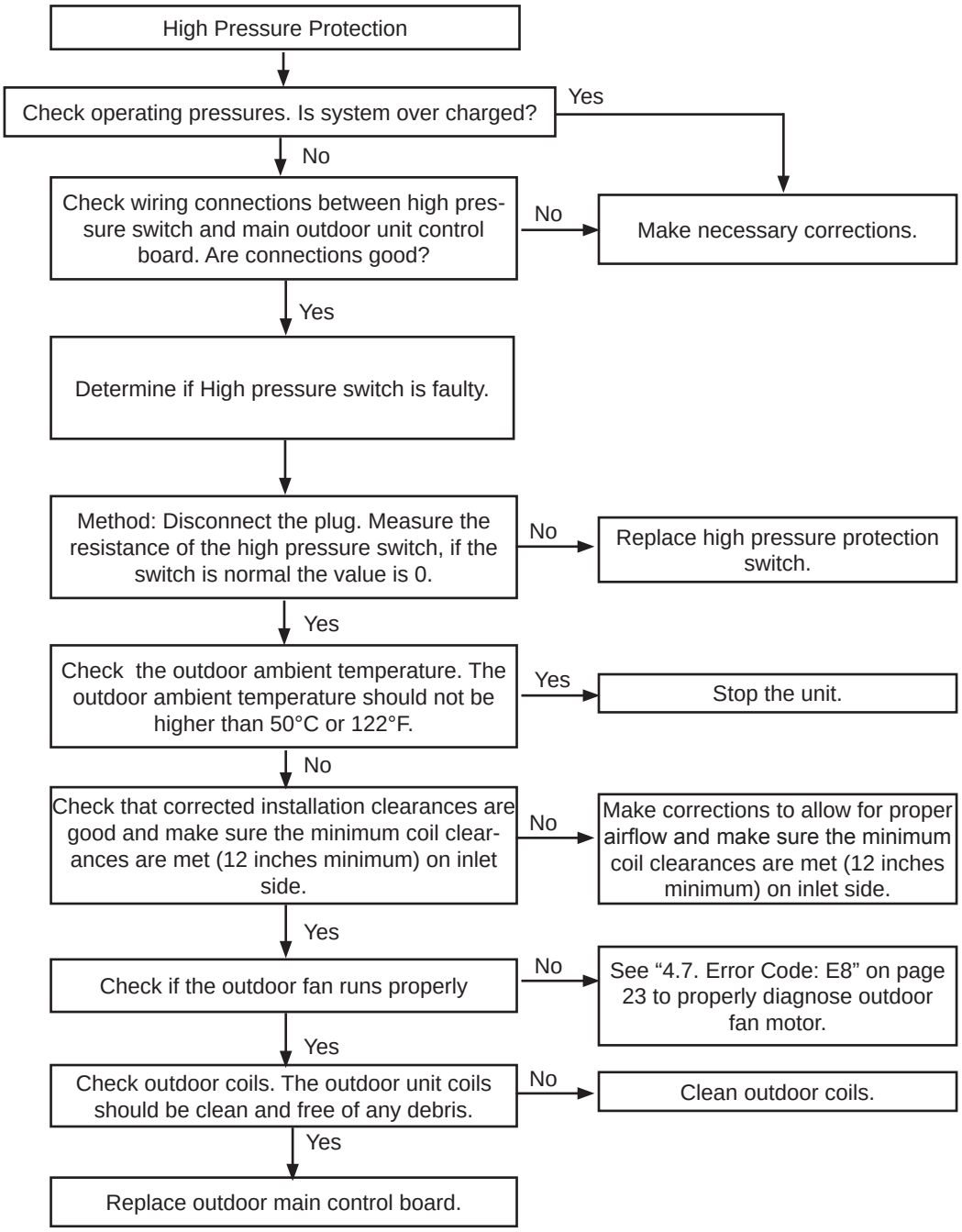
Description:	Indoor unit #1, #2, #3, #4 and #5 coil outlet temperature (T2) sensor error.
General Note:	If the sampling voltage is not 5V, the LED will display this failure.



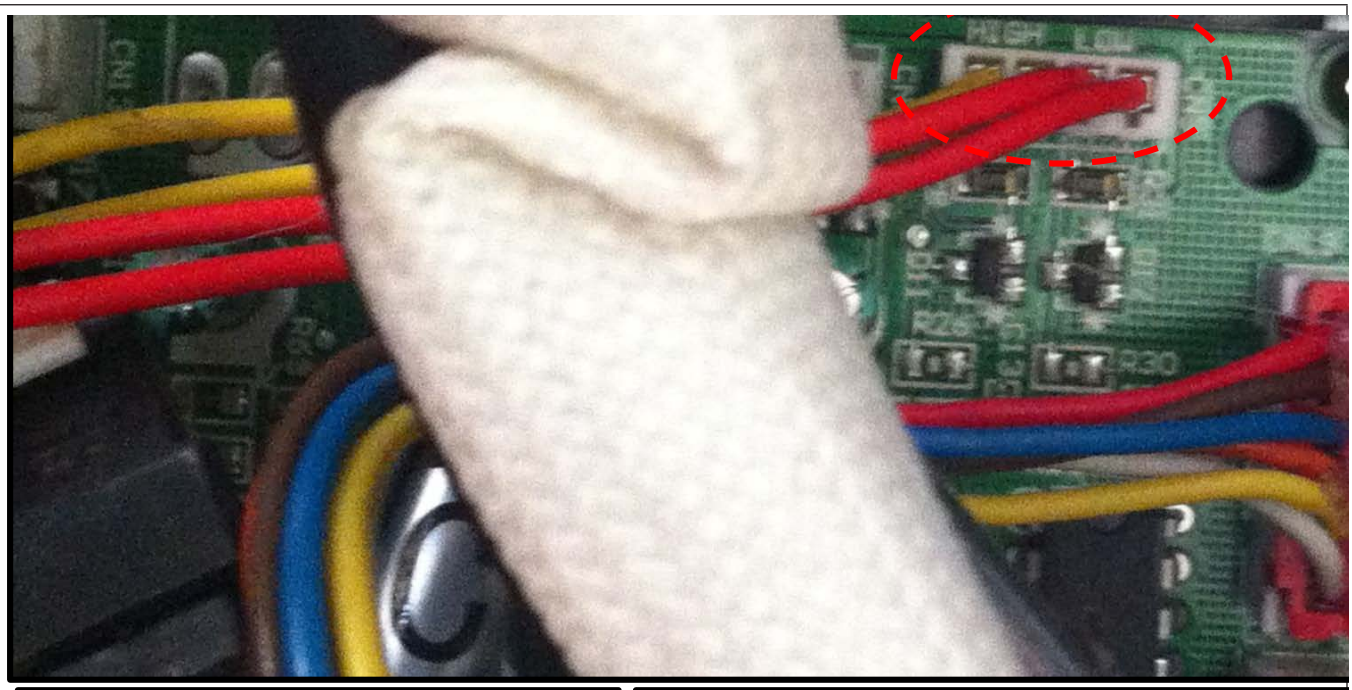


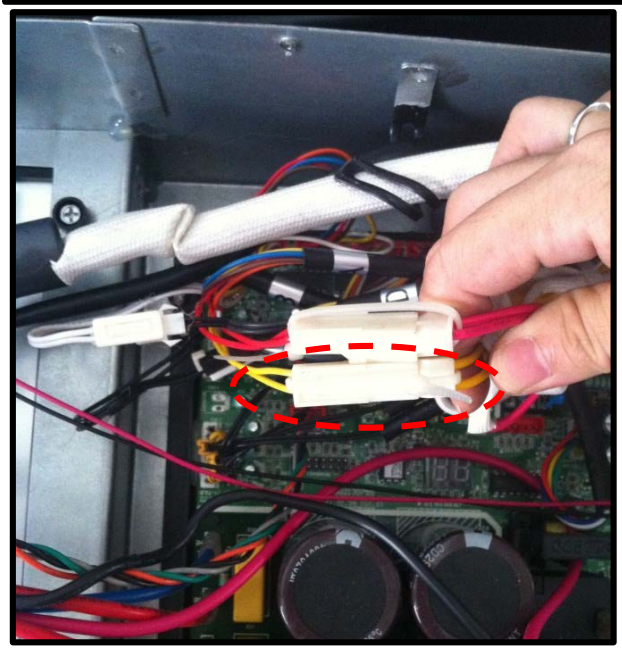
4.9. Error Code: P1

Description:	High pressure switch open. High pressure switch trips at 639 PSI and resets at 464 PSI.
General Note:	If the sampling voltage is not 5V, the LED will display this failure.



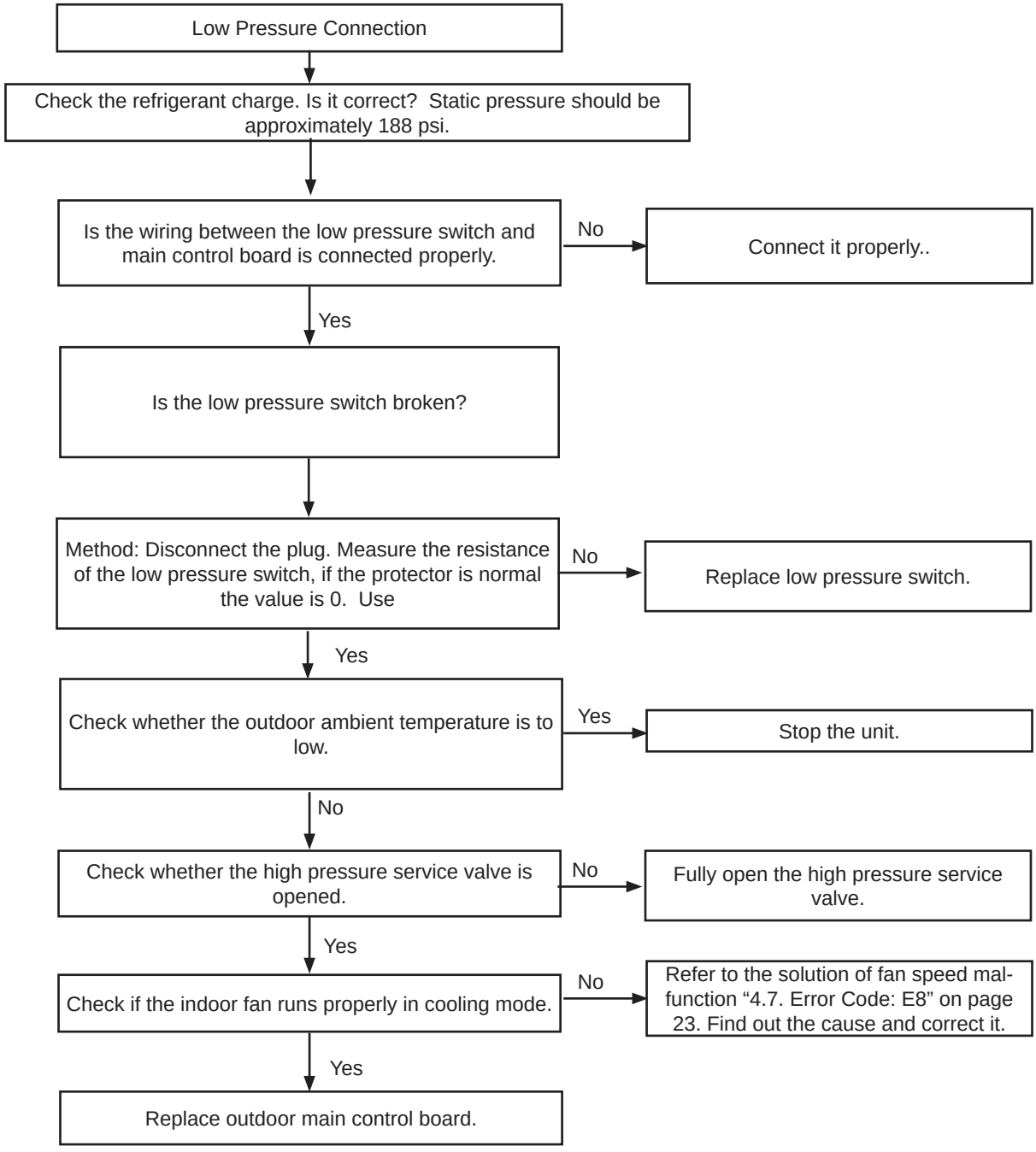
Error Code:	P1 (continued)



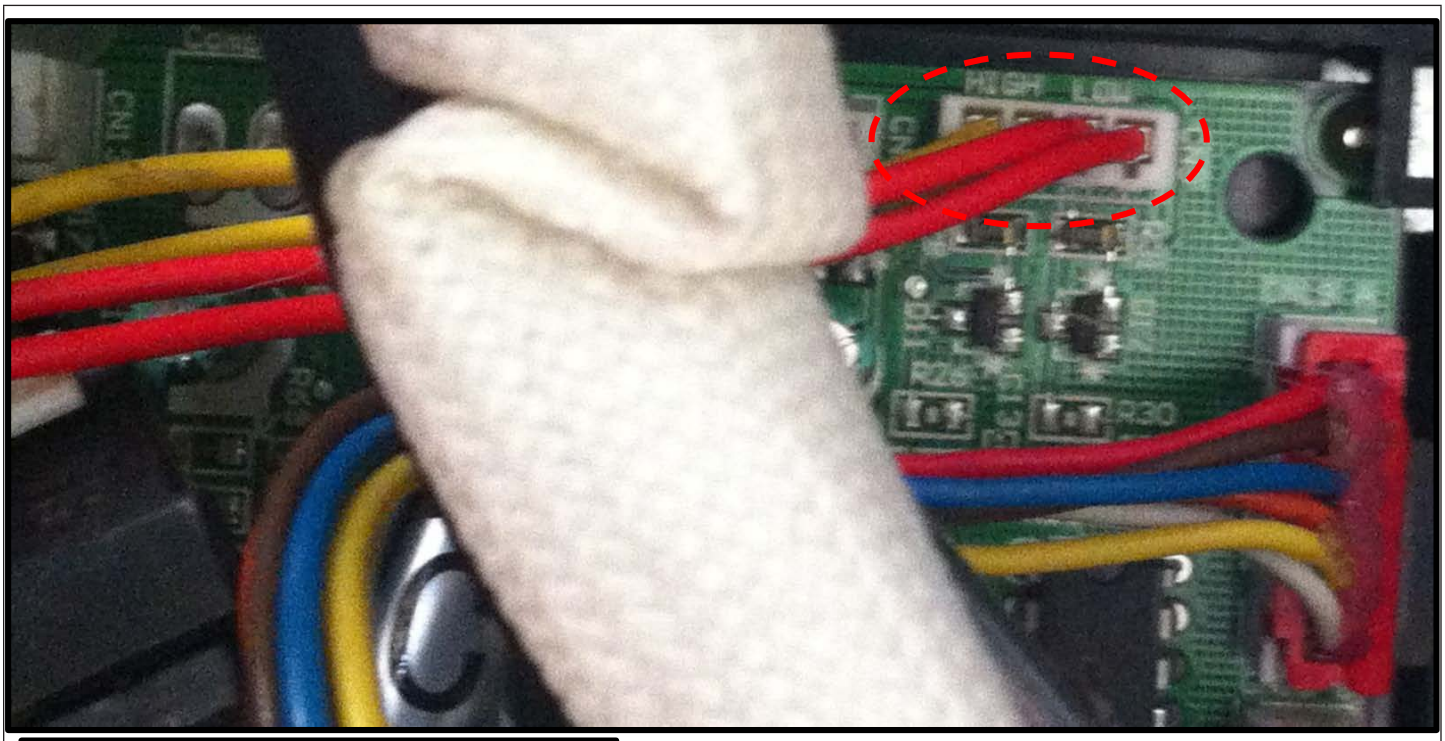


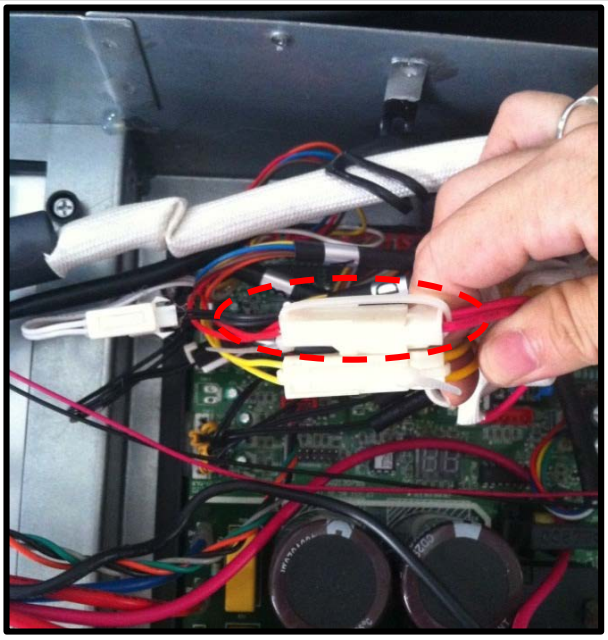
4.10. Error Code: P2

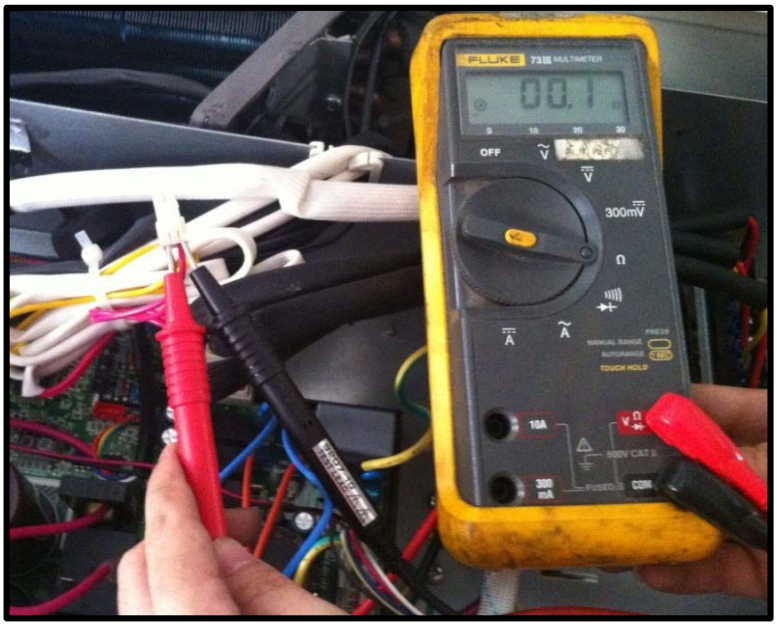
Description:	Low pressure switch open. P2 Low pressure switch trips at 20 psi and resets at 43 PSI.
General Note:	If the sampling voltage is not 5V, the LED will display this failure.



Error Code:	P2 (continued)

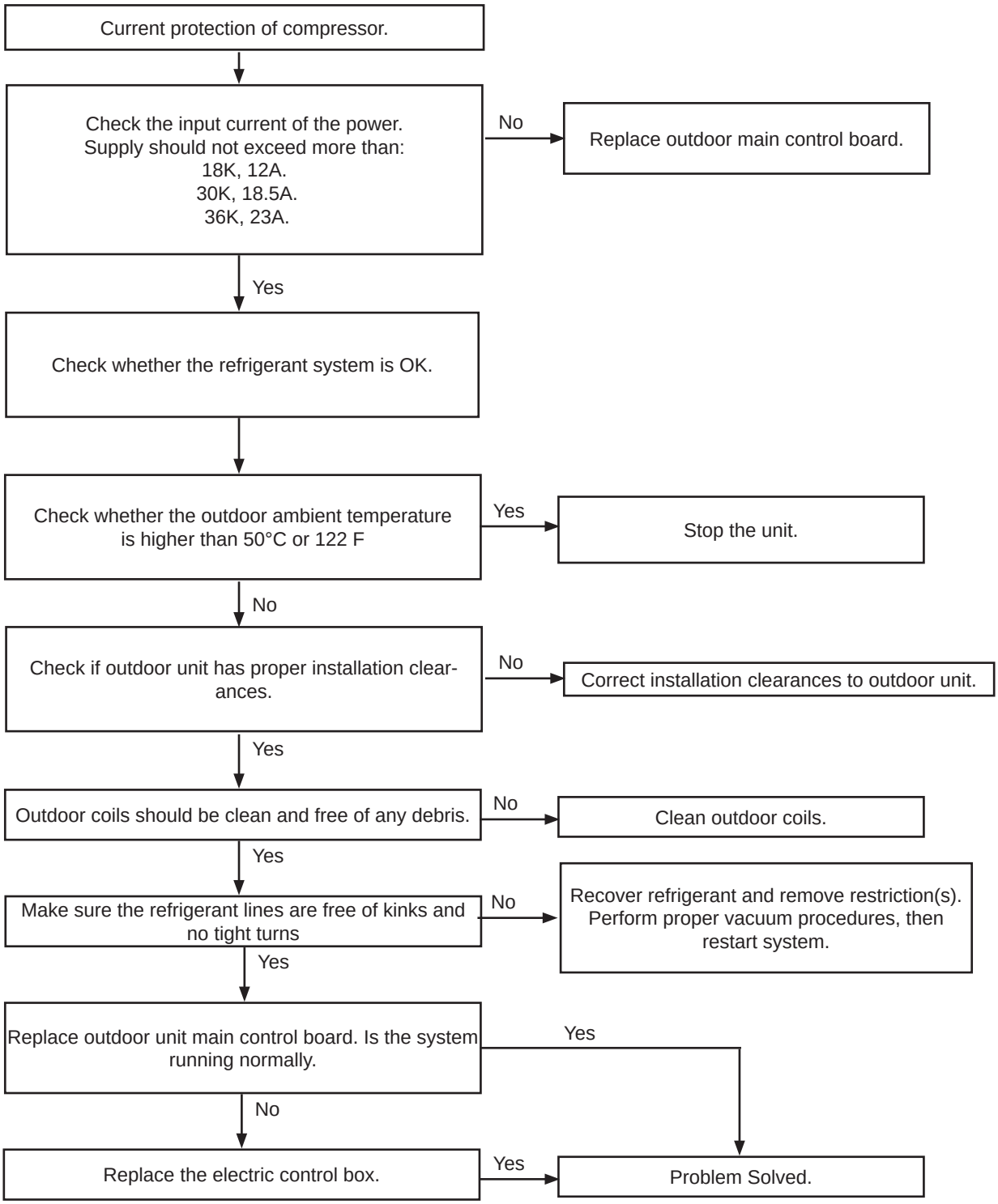






4.11. Error Code: P3

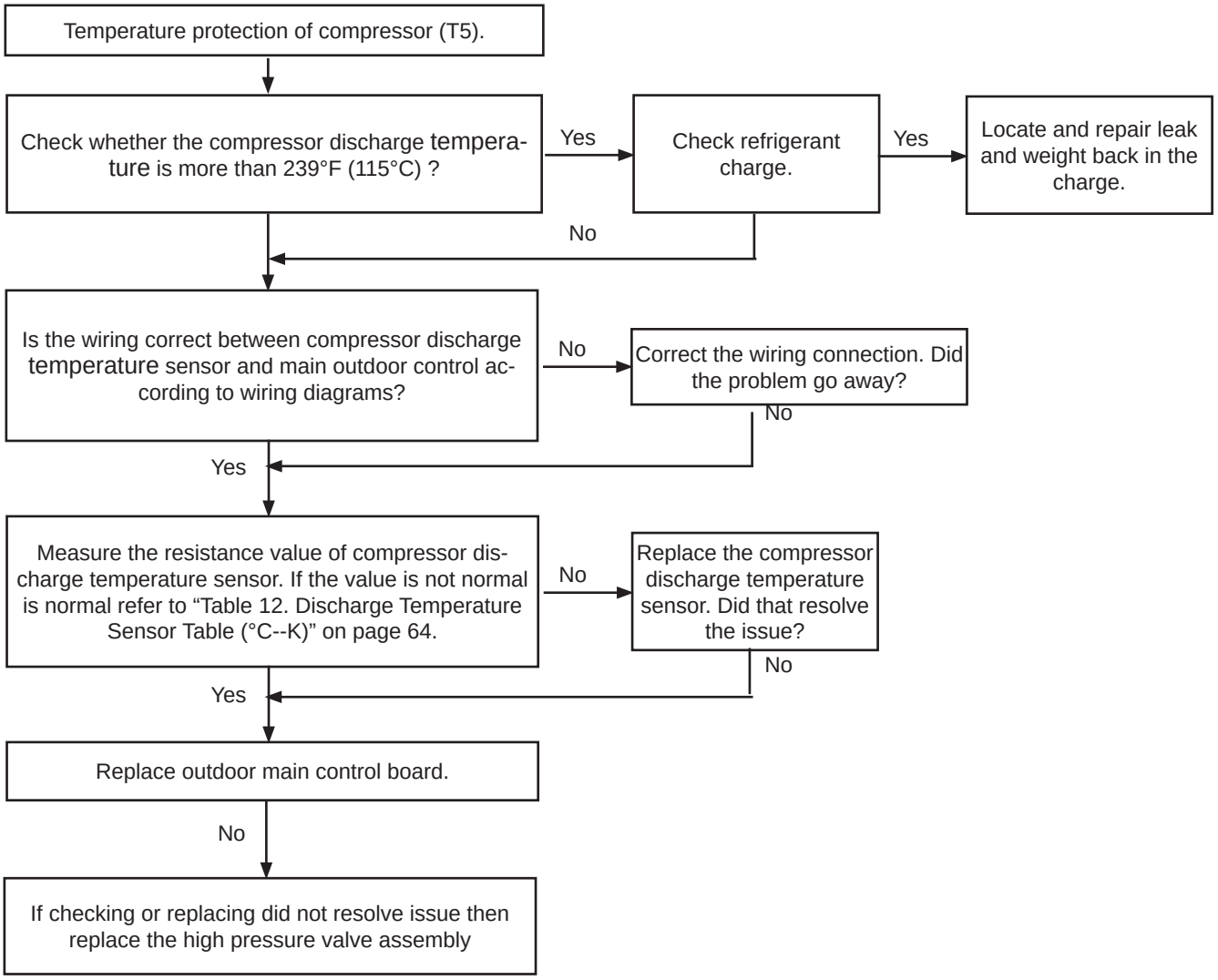
Description:	Outdoor compressor current overload sensed
General Note:	If the outdoor current exceeds the current limit value, the LED will display the failure.



Error Code:	P3 (continued)

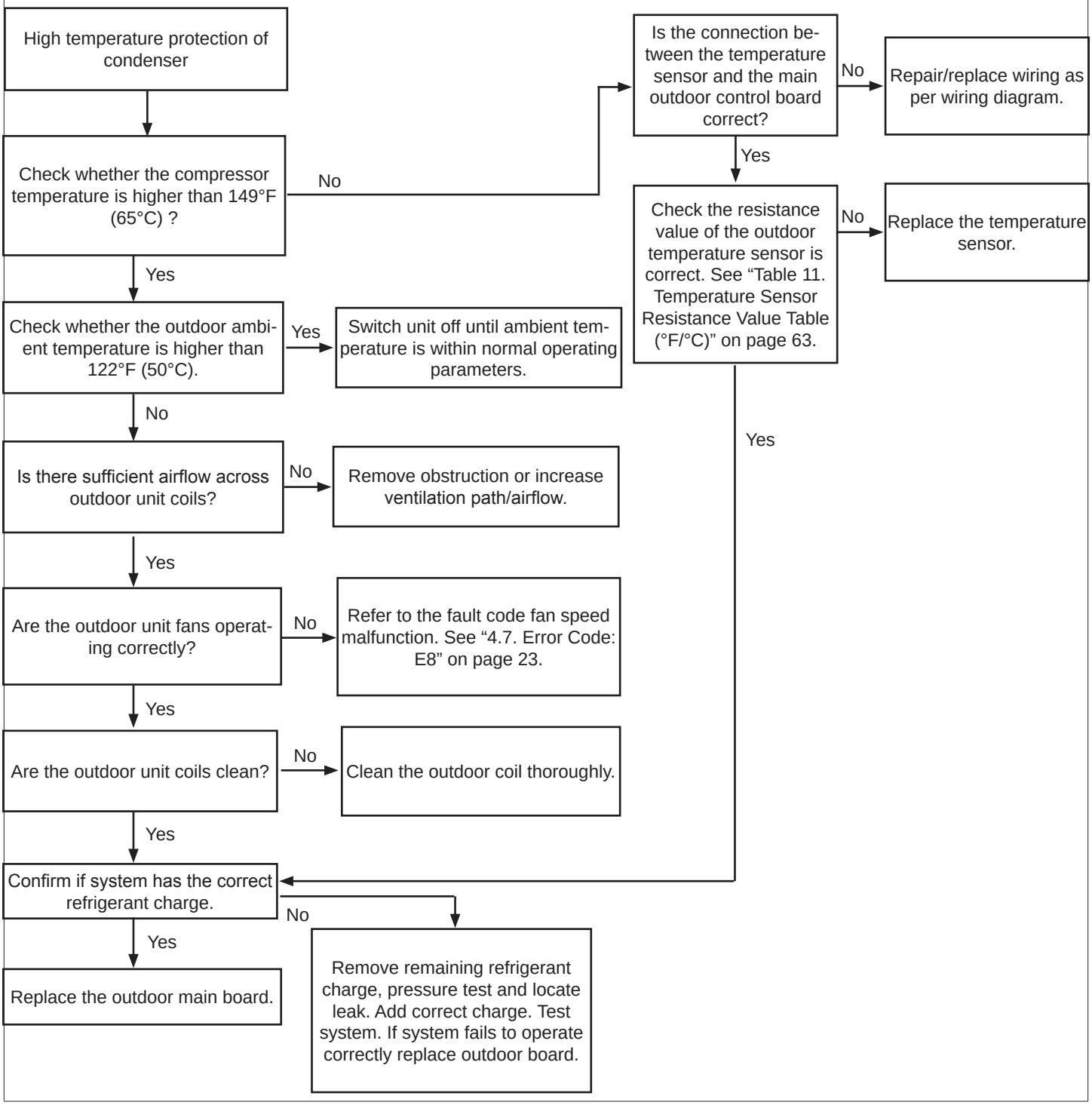
4.12. Error Code: P4

Description:	High temperature sensed at compressor discharge line.
General Note:	When the compressor discharge temperature (T5) is more than 239°F (115°C) for 10 seconds, the compressor will stop and restart until T5 is less than 194°F (90°C).



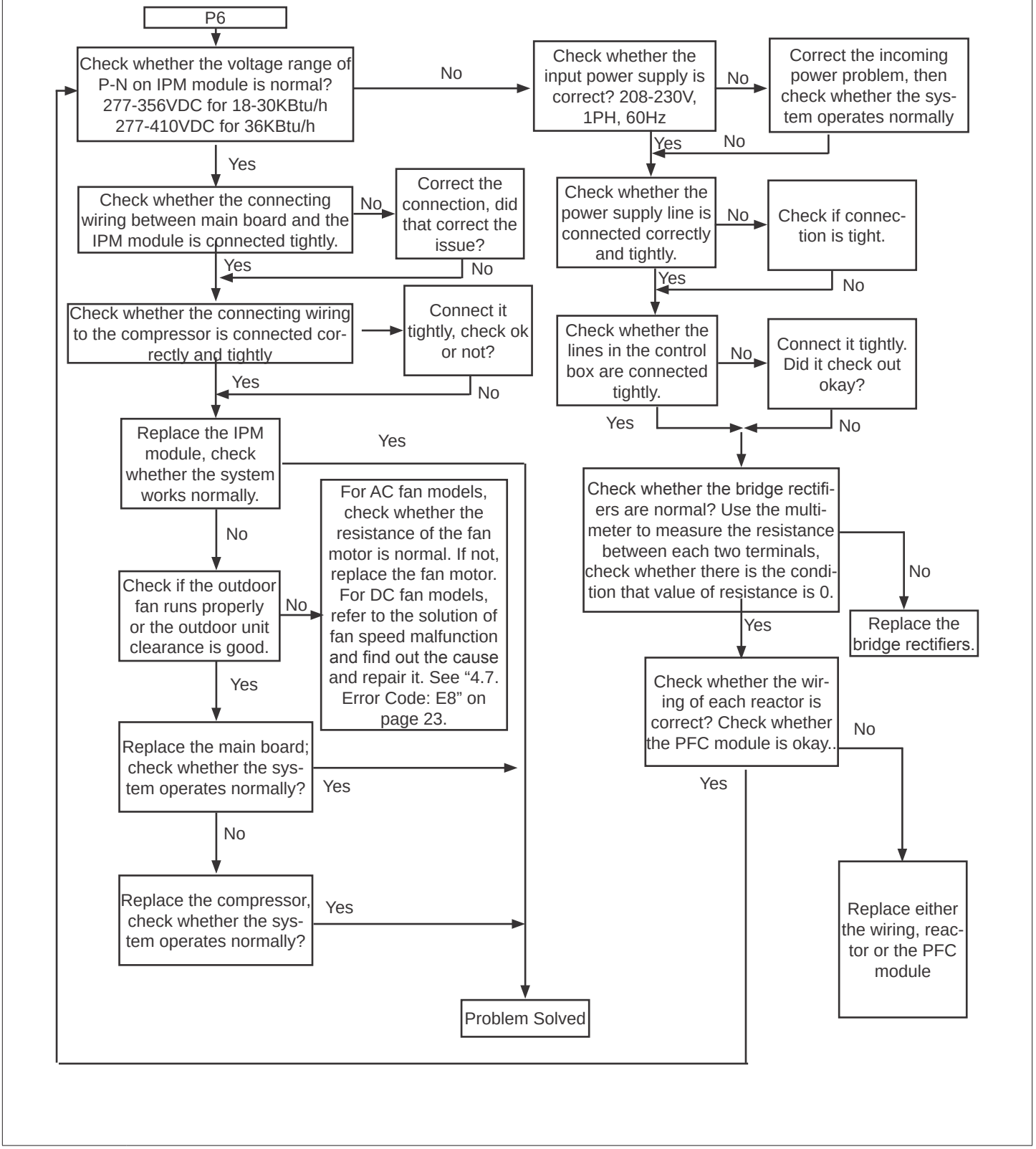
4.13. Error Code: P5

Description:	High temperature sensed at outdoor coil (T3).
General Note:	When outdoor pipe temperature is more than 149°F (65°C), the unit will stop, and unit runs again when outdoor pipe temperature is less than 125.6°F (52°C).



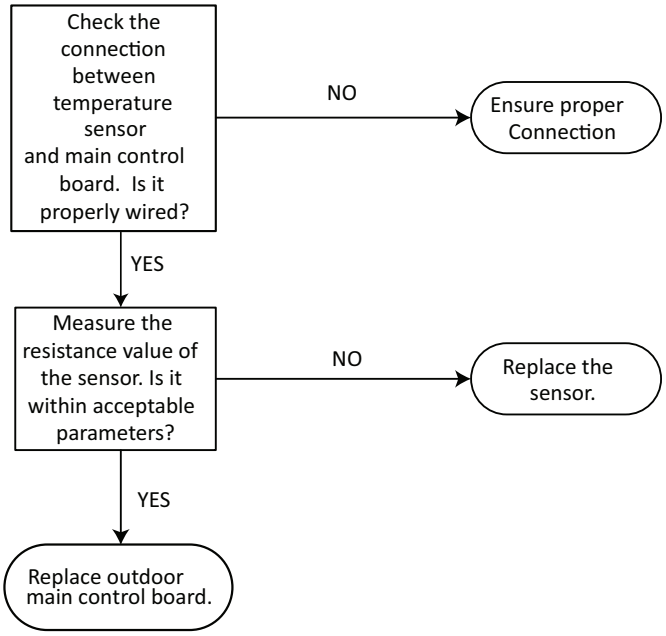
4.14. Error Code: P6

Description:	Integrated power module (IPM) error.
General Note:	When the voltage signal that IPM sends to the compressor drive chip is abnormal, the display LED will show “P6” and unit will turn Off.



4.15. Error Code: P7

Description:	Outdoor Integrated Power Module (IPM) Module Temperature Sensor Malfunction Diagnosis and Solution
General Note:	If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED displays a failure.

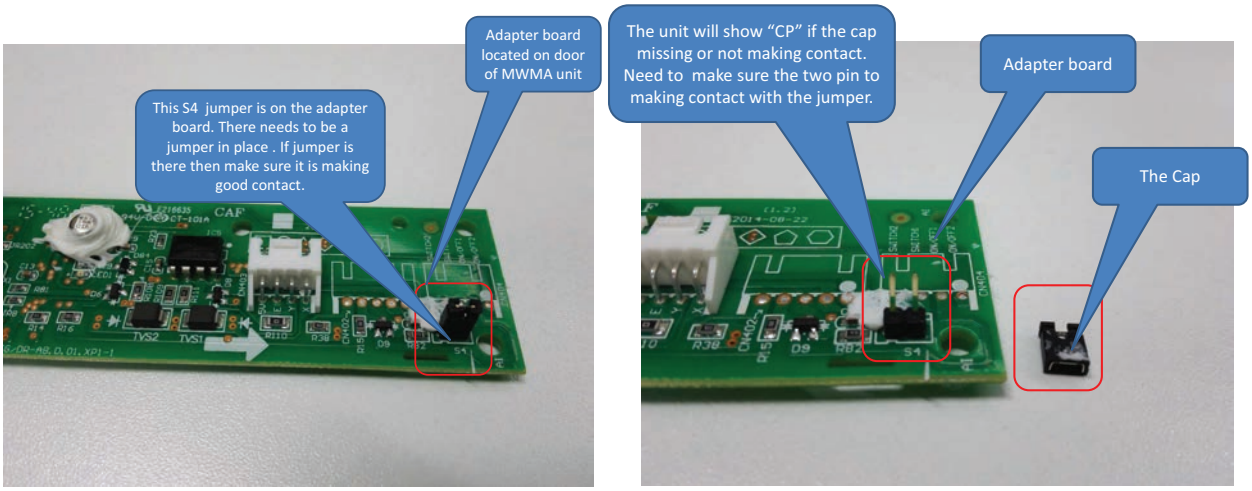


5. Extended Reference Guide - Indoor Unit Error Codes

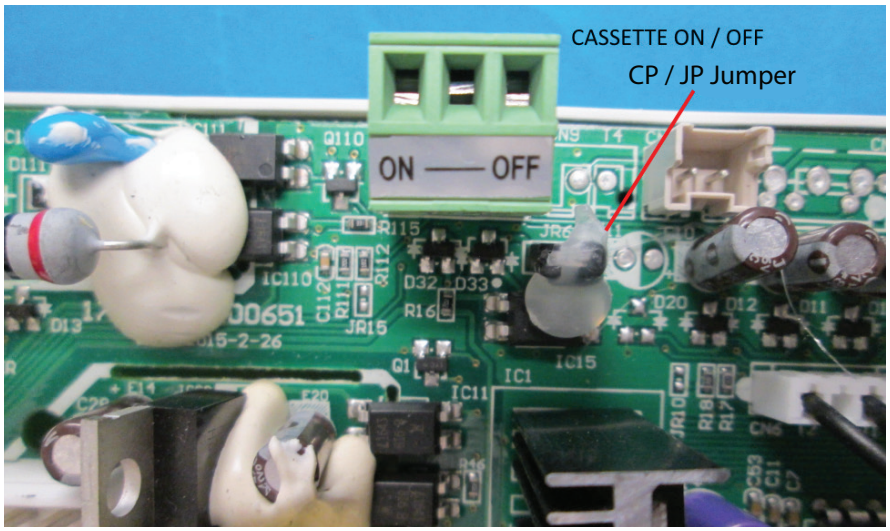
5.1. Error Code: CP

Description:	MCFA, MCFB, MMDA, MMDB, MWMA, MWMB and 3WMB models only.
General Note:	None.

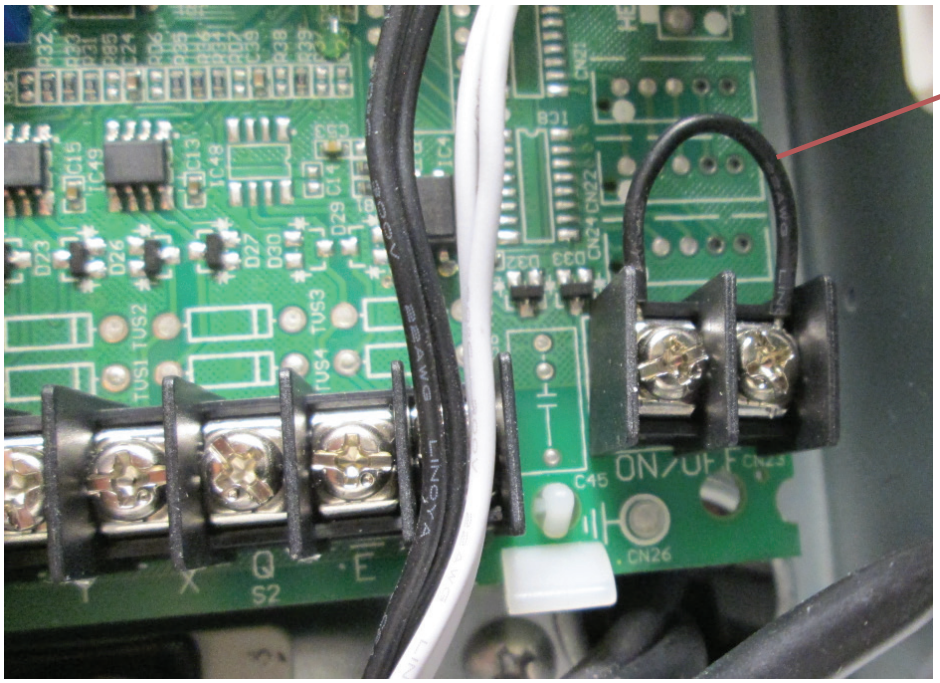
MWMA, MWMB and 3WMB



M22A, M33A and M33B

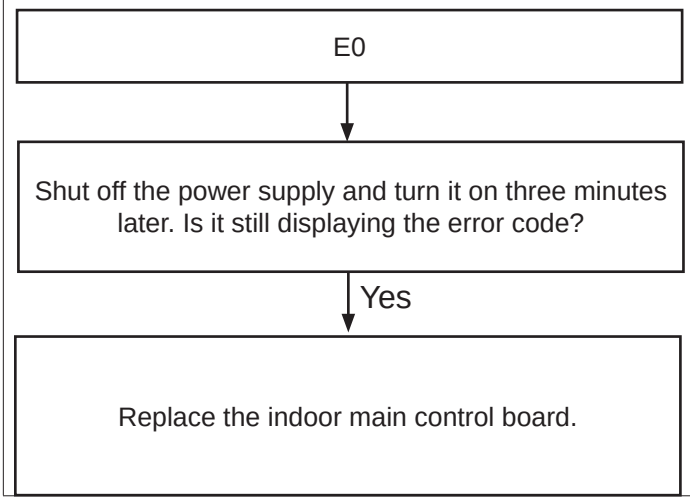


MMDA and MMDB



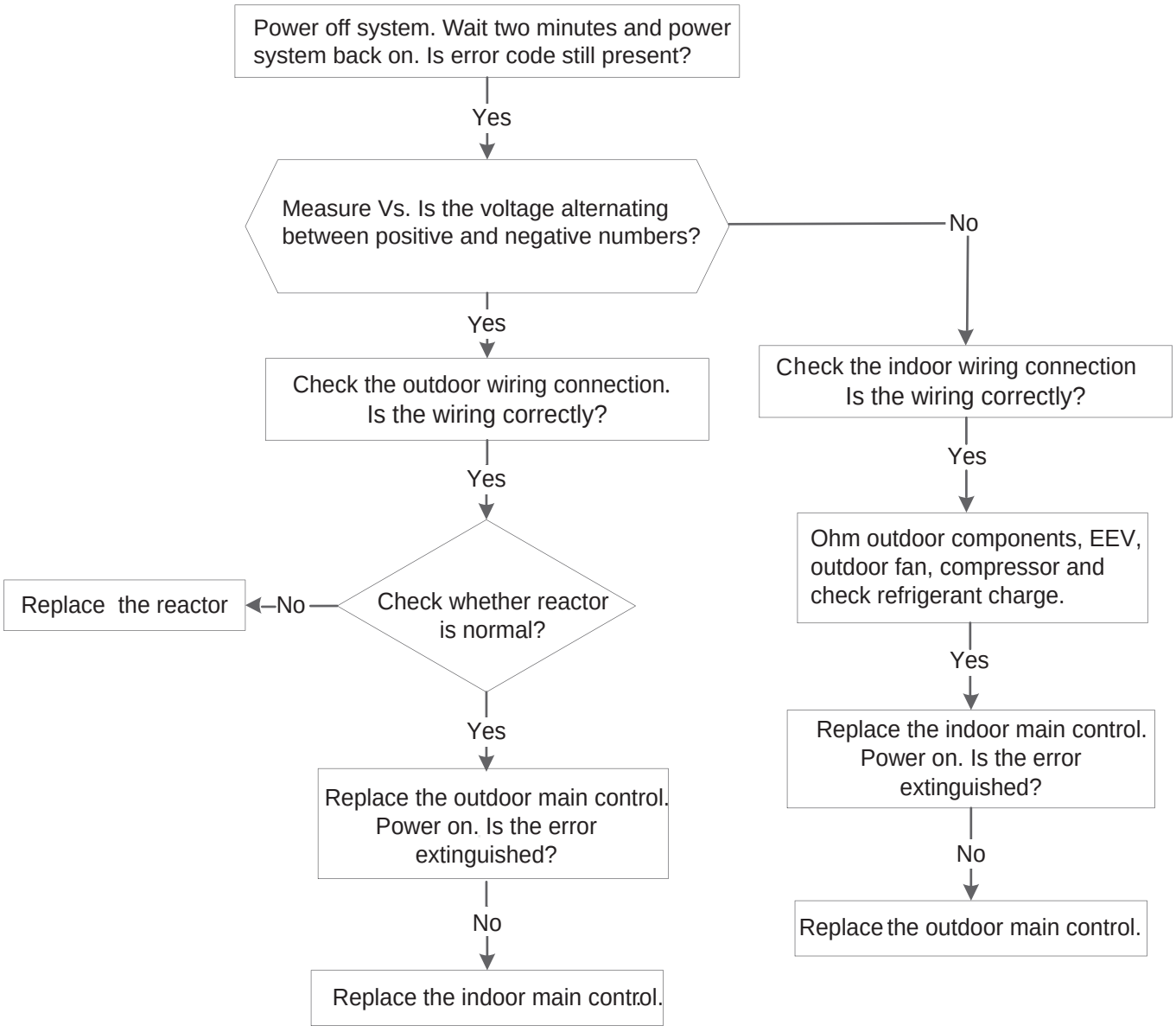
5.2. Error Code: E0

Description:	Indoor Unit EEPROM malfunction.
General Note:	Main Outdoor Control board's main chip is not receiving feedback from EEPROM chip.

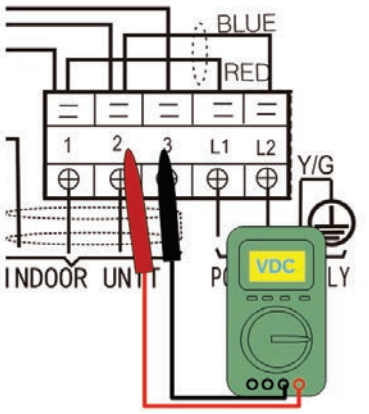


5.3. Error Code: E1

Malfunction decision conditions:	Indoor unit did not receive feedback from outdoor unit for 110 seconds and this condition has repeated four times continuously.
Supposed causes	• Wiring error • Indoor or outdoor main control board fault



Error Code:	E1 (continued)



REMARK: Use a multimeter to test the DC voltage between L2 and L3 of outdoor unit. The red pin of the multimeter connects with L2 while the black pin is for L3.

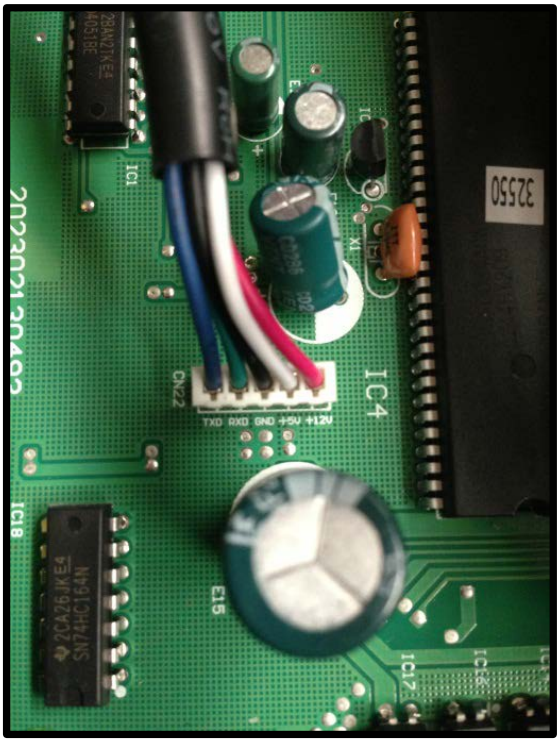
When AC is running normally, the votlage will move alternately between a negative and a positive number.

If positive reading the outdoor board needs to be replaced.

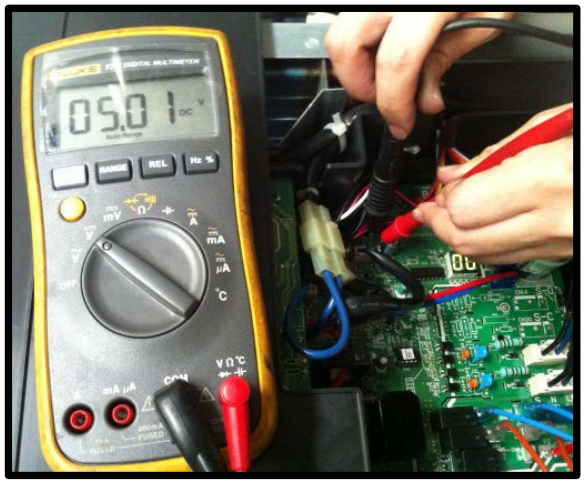
If negative reading then the indoor board needs to be replaced.

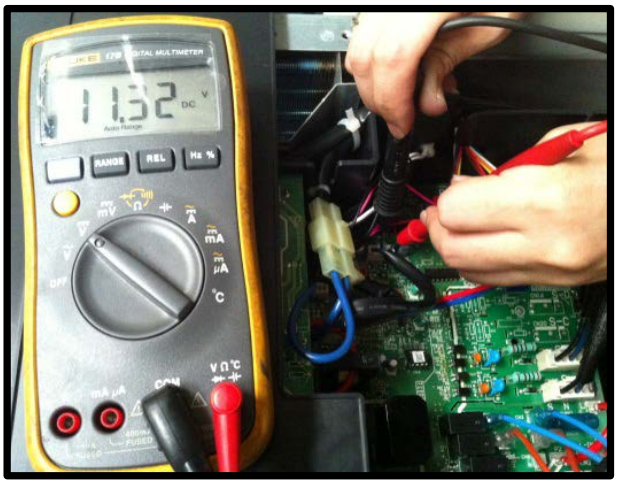
REMARK: Use a multimeter to test the resistance of the reactor which does not connect with the capacitor.
The normal value should be around zero ohm. Otherwise, the reactor has malfunctioned.

Error Code:	E1 (continued)



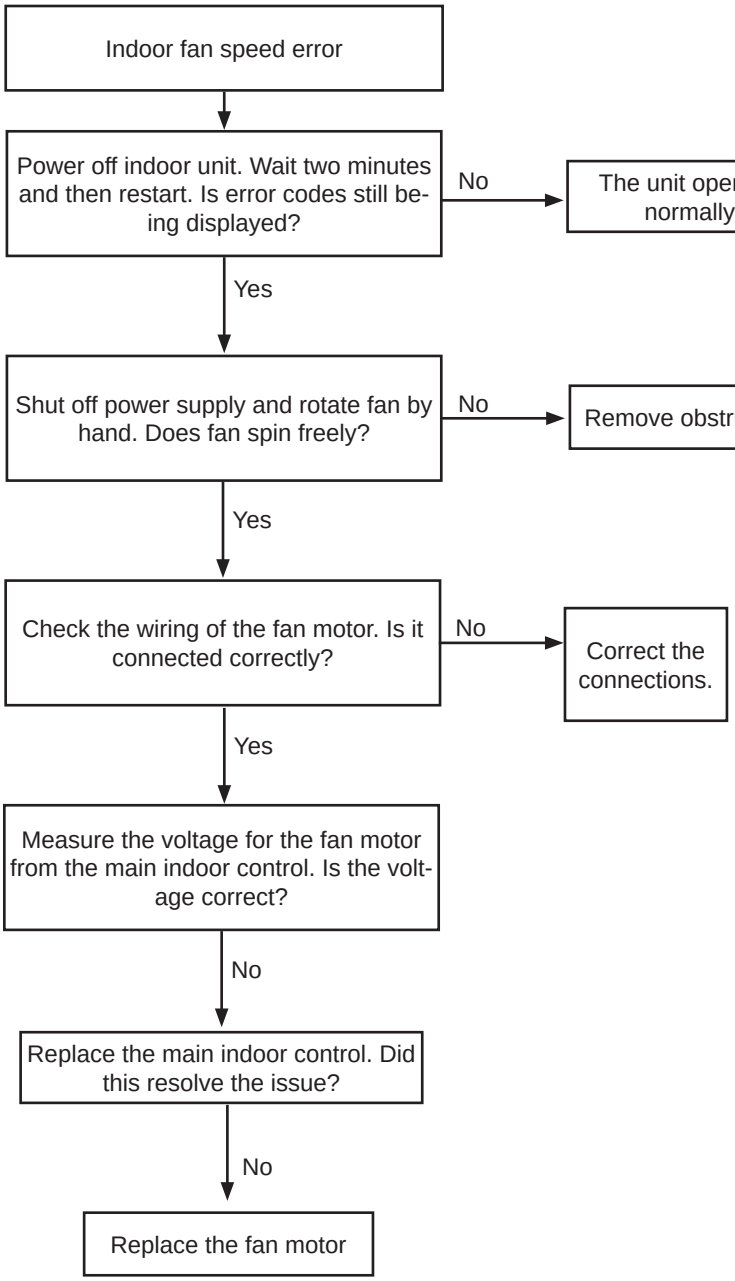
NOTE - Use a multimeter to test the DC voltage between black pin and white pin of signal wire The normal value should be around 5V.
Use a multimeter to test the DC voltage between black pin and red pin of signal wire. The normal value should be around 12V.





5.4. Error Code: E3

Description:	Indoor fan speed error.
General Note:	When indoor fan speed runs too low (300 RPM) for a predefined amount of time, the unit will stop and the LED will display the error.



Indoor DC Fan Motor Check

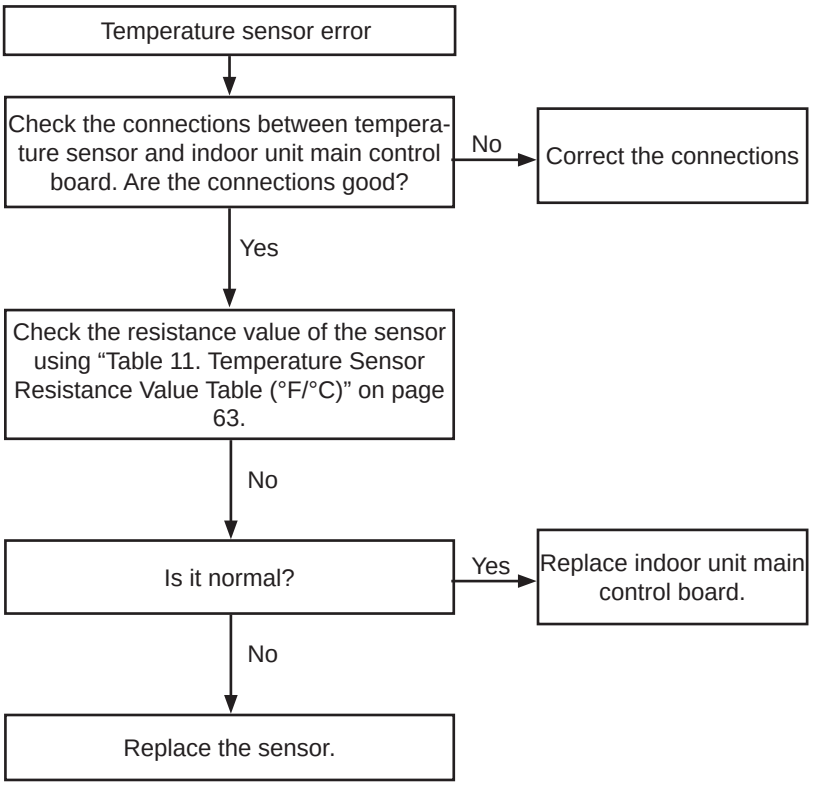
1. Indoor DC fan motor (Control Chip is in Fan Motor)
2. Turn power on and while the unit is on standby, measure the voltage between pin 1 and pin 3 as well as between pin 4 and pin 3 in fan motor connector. If the value of the voltage is not within the range shown in the following table, the indoor unit main control board may be experiencing problems and need to be replaced.

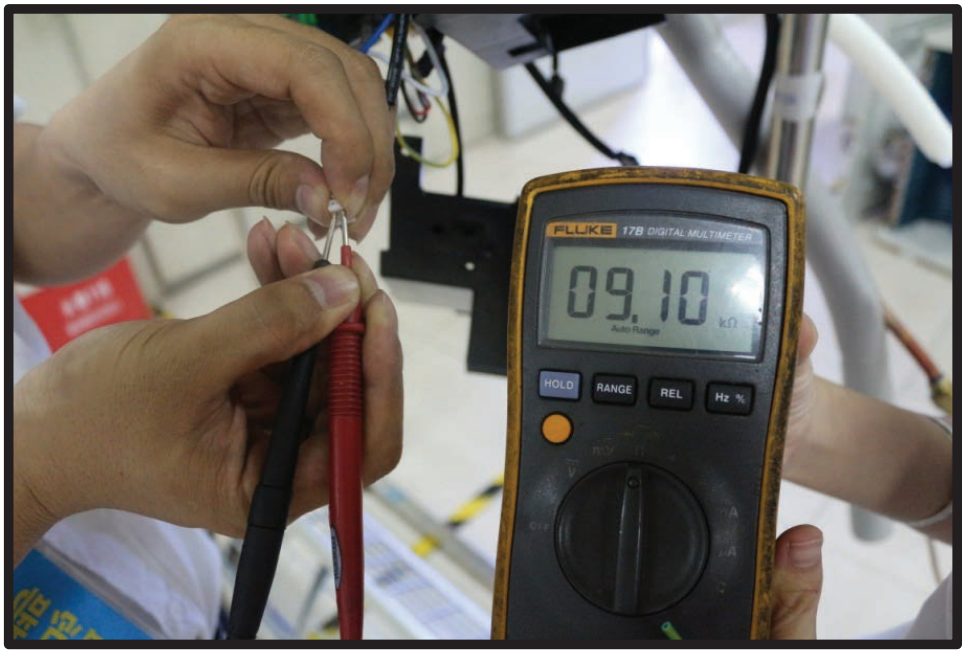
DC Motor Voltage Input and Output

NO.	Color	Signal	Voltage
1	Red	Vs/Vm	200~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5~16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5~16.5V

5.5. Error Code: E4

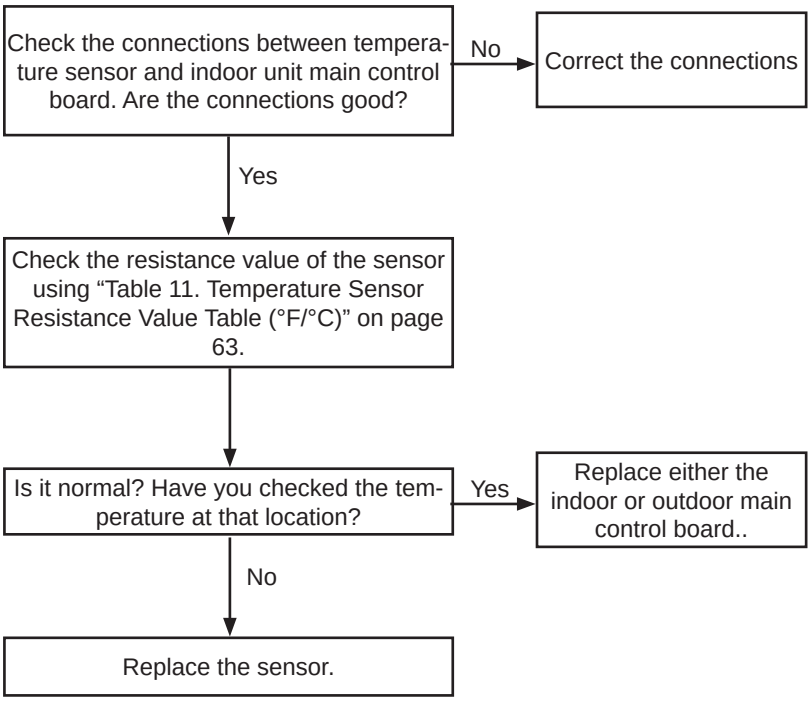
Description:	Indoor return air temperature (T1) sensor error.
General Note:	If the voltage is lower than 0.06V or higher than 4.94V, the LED will display this error.

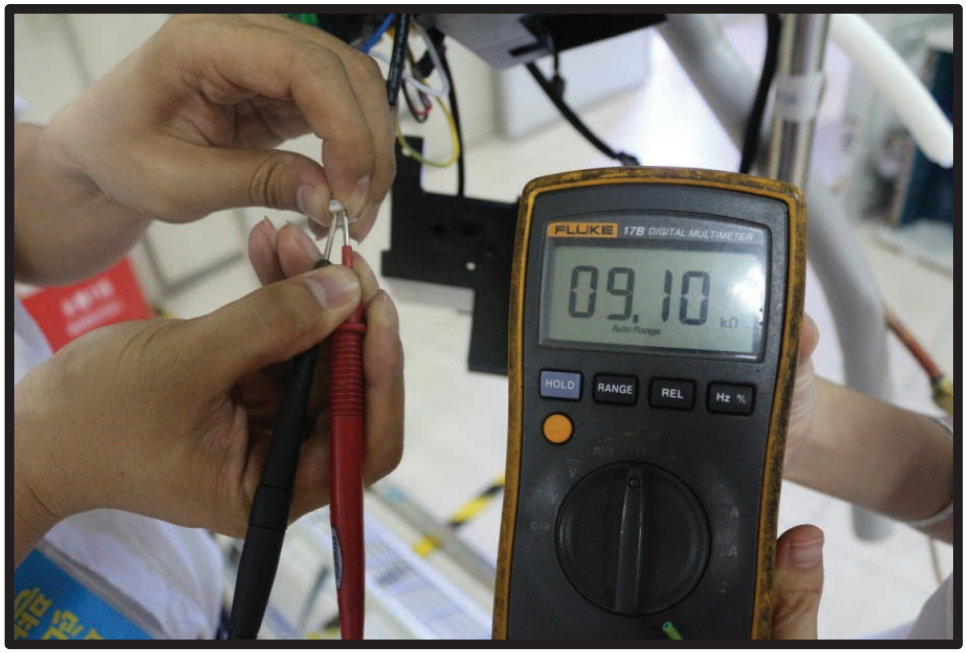




5.6. Error Code: E5

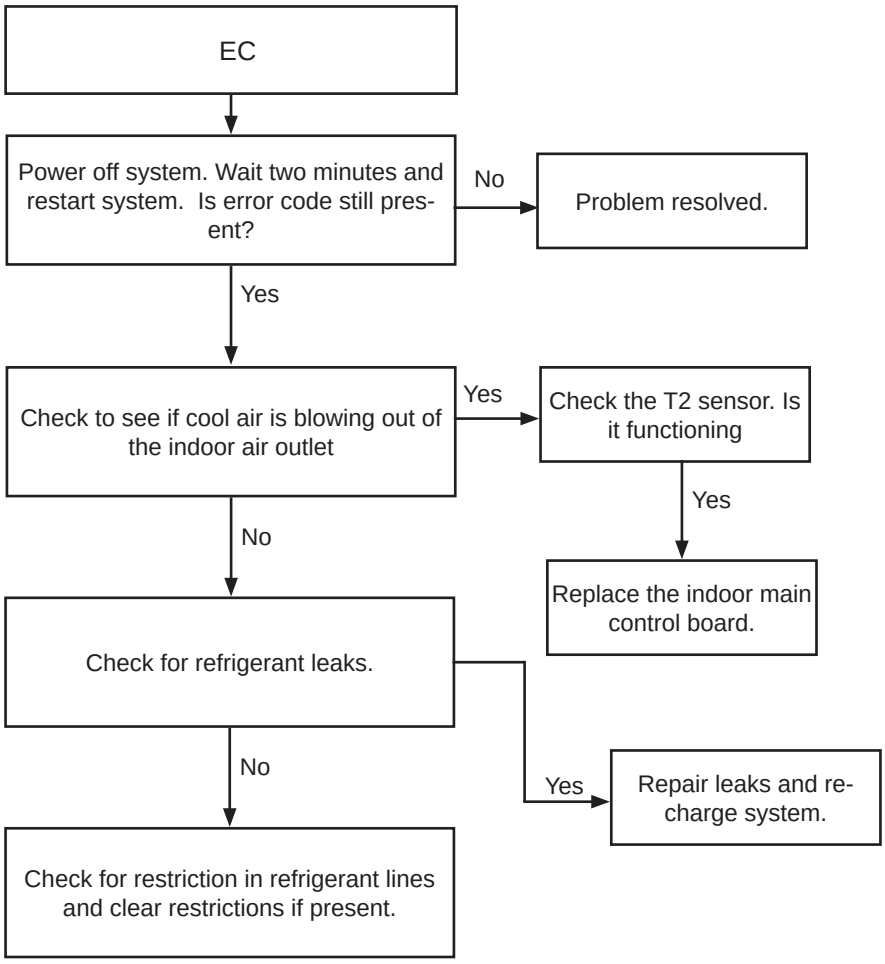
Description:	Indoor Coil Temperature (T2) Sensor Error
General Note:	If the voltage is lower than 0.06V or higher than 4.94V, the LED will display the error.





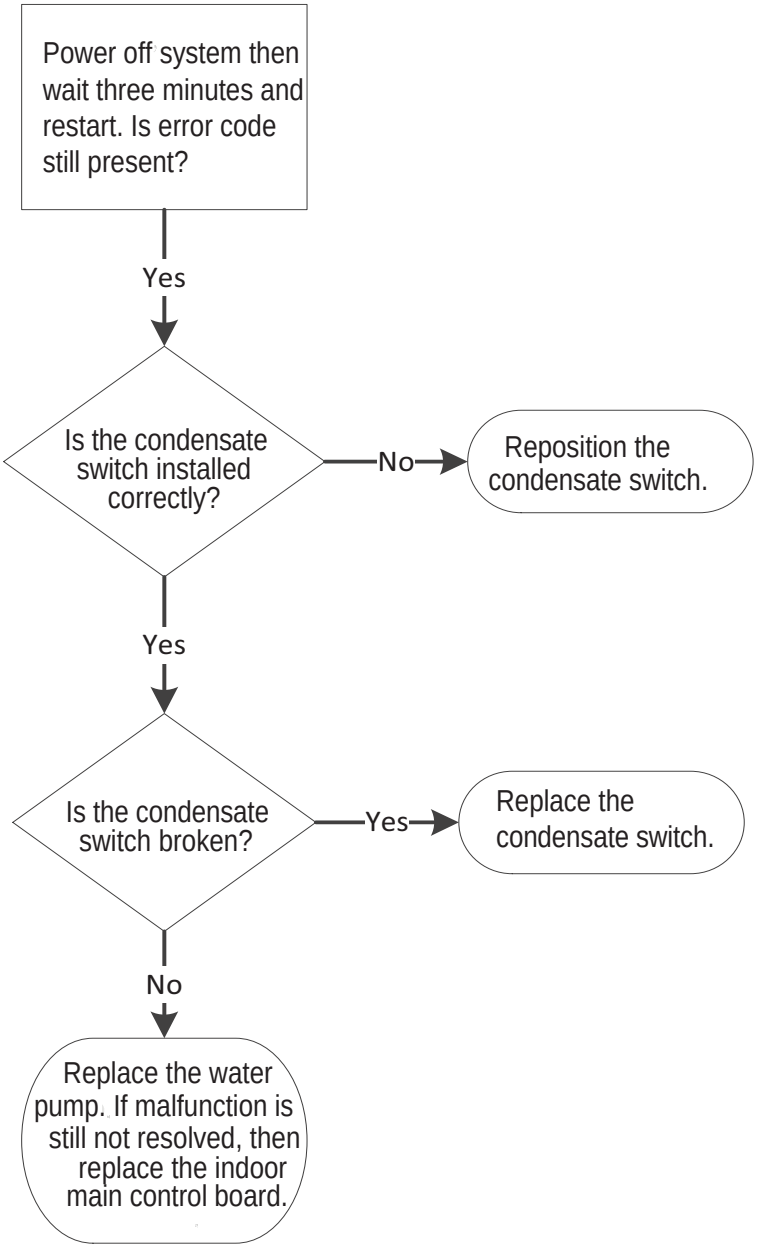
5.7. Error Code: EC

Description:	Low Refrigerant Error
General Note:	The system monitors the value of evaporator coil sensor T2 for the first 5 minutes after startup. If the temperature of T2 drops per this formula three times in the first 5 minutes of operation, the system shuts down and the error code is displayed. For this formula “Tcool” = the T2 temperature at startup. T2 < Tcool - 3.6°F (2°C)



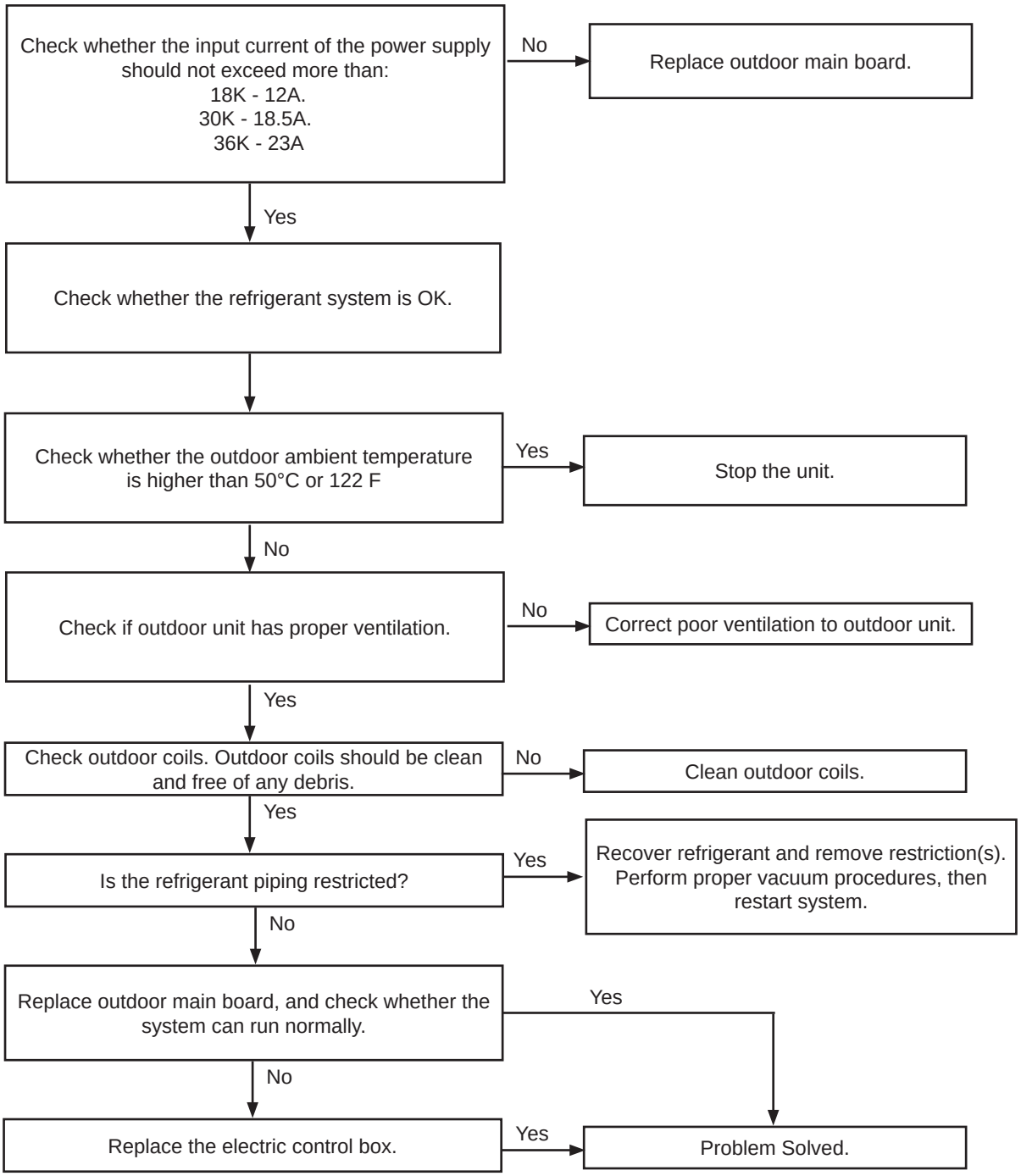
5.8. Error Code: EE

Description:	Condensate switch (water level) alarm malfunction. (For M22A, M33A/B and MMDA units)
General Note:	If the sampling voltage is not 5V, the LED will display this failure. • Wiring mistakes • Faulty water-level switch • Faulty water pump • Faulty indoor main control board. ***NOTE:*** *Float is in the down postilion unless the condensate is restricted and the float has risen.* ***NOTE:*** *Water pump runs 100% of the time when the unit is calling for cooling.*



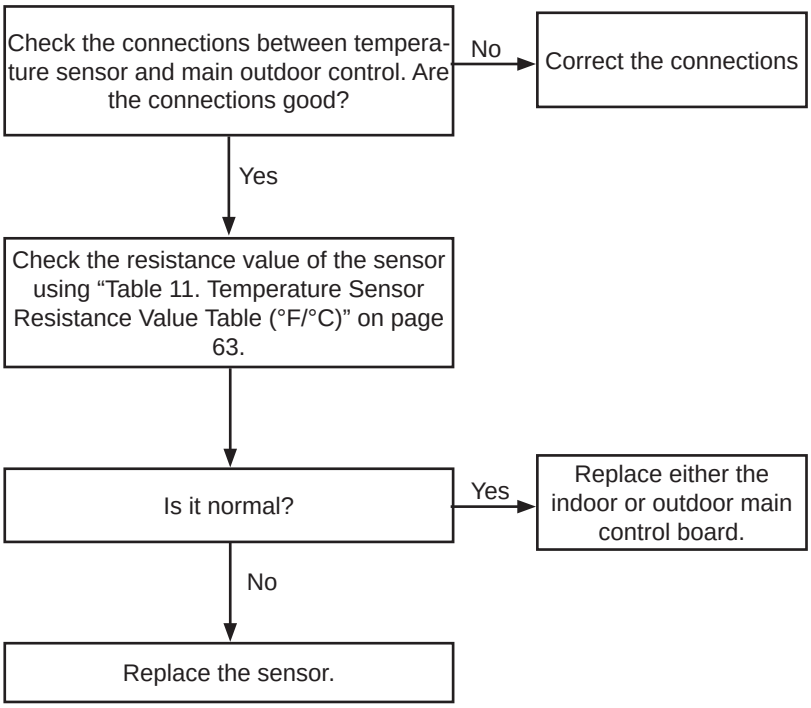
5.9. Error Code: F0

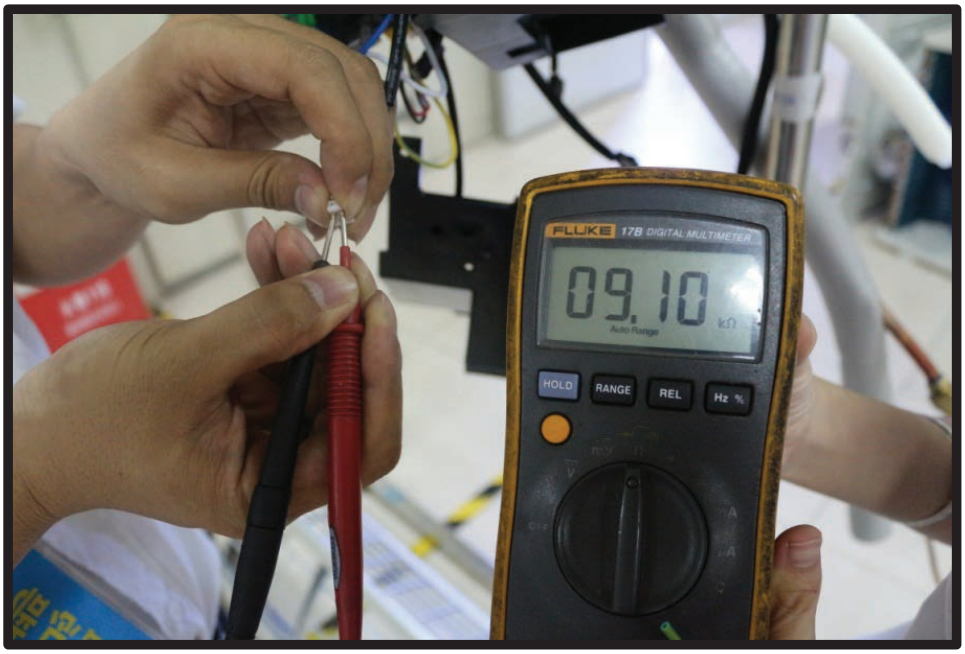
Description:	Outdoor compressor current overload sensed
General Note:	If the outdoor current exceeds the current limit value, the LED will display this failure.



5.10. Error Code: F1

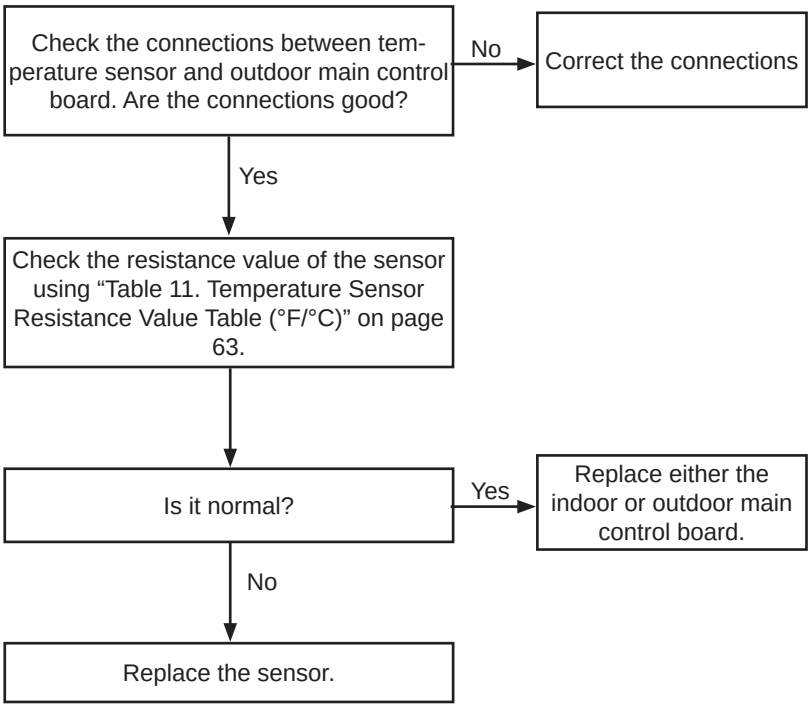
Description:	Outdoor Temperature Sensor T4 Error.
General Note:	If the voltage is lower than 0.06V or higher than 4.94V, the LED will display the error.

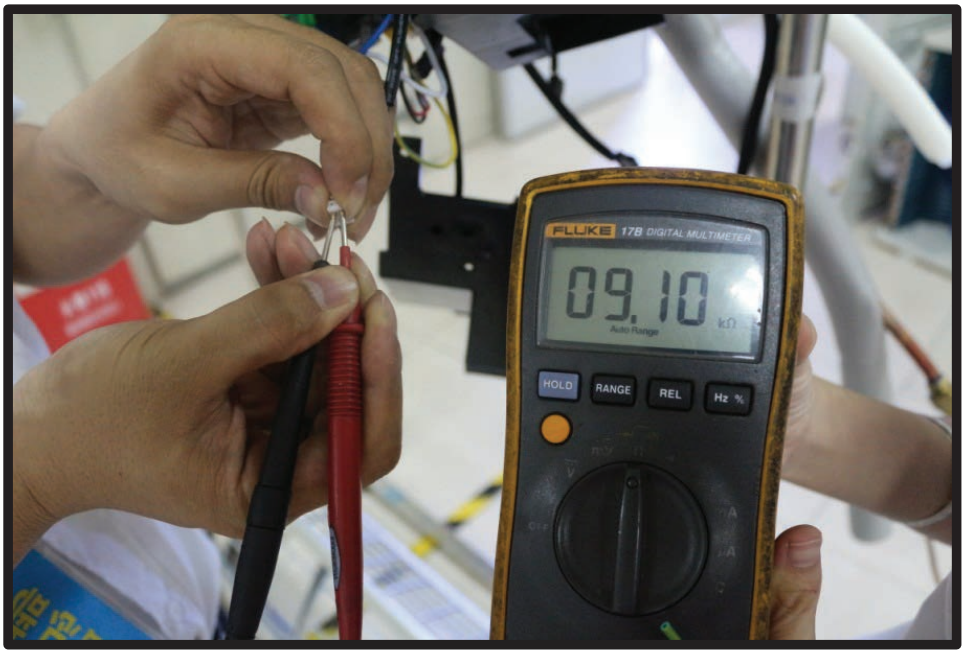




5.11. Error Code: F2

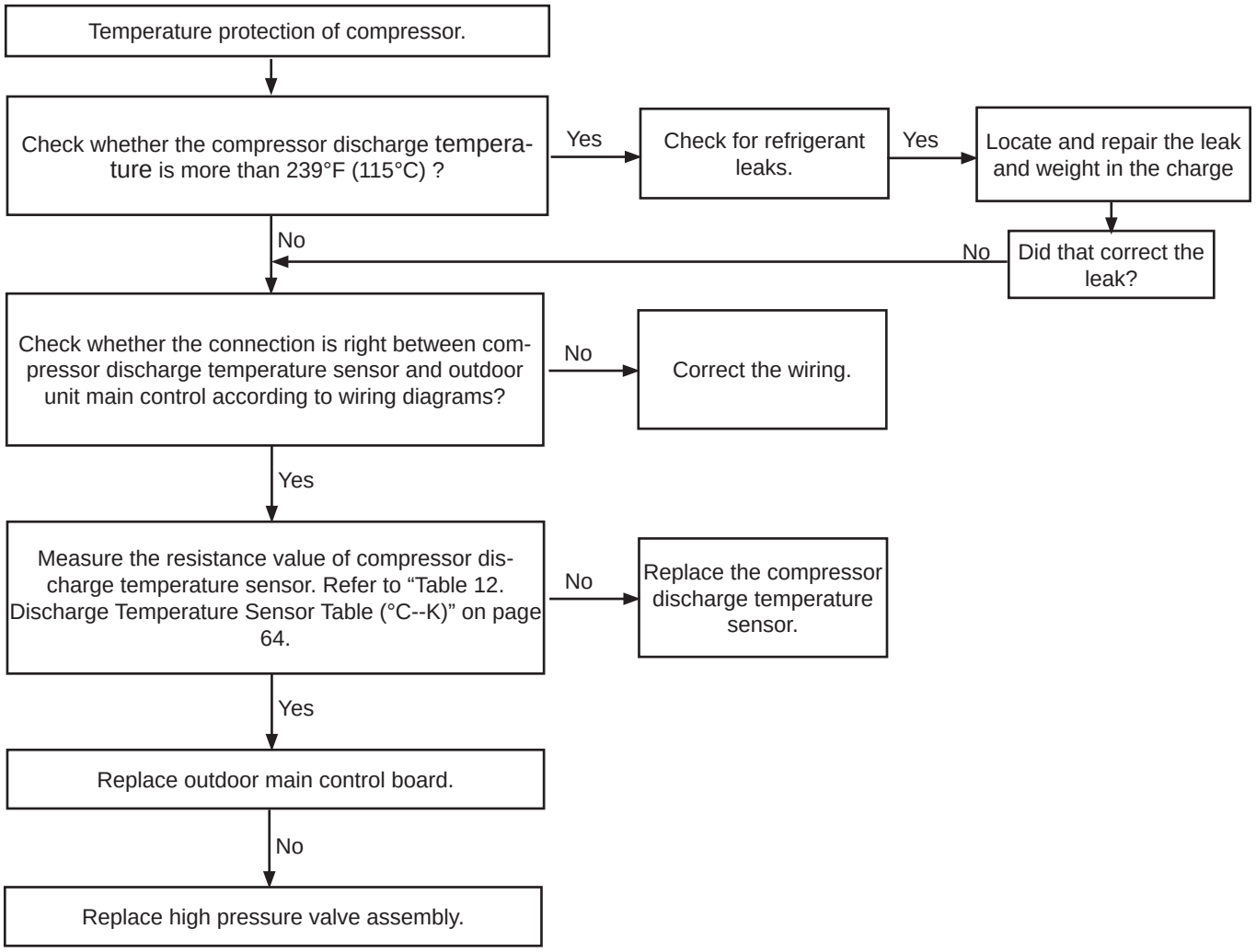
Description:	Faulty Outdoor Coil Temperature Sensor T3
General Note:	If the voltage is lower than 0.06V or higher than 4.94V, the LED will display the error.





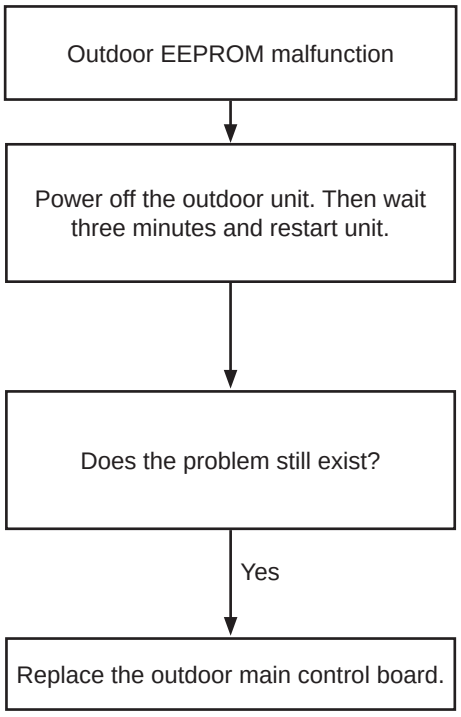
5.12. Error Code: F3

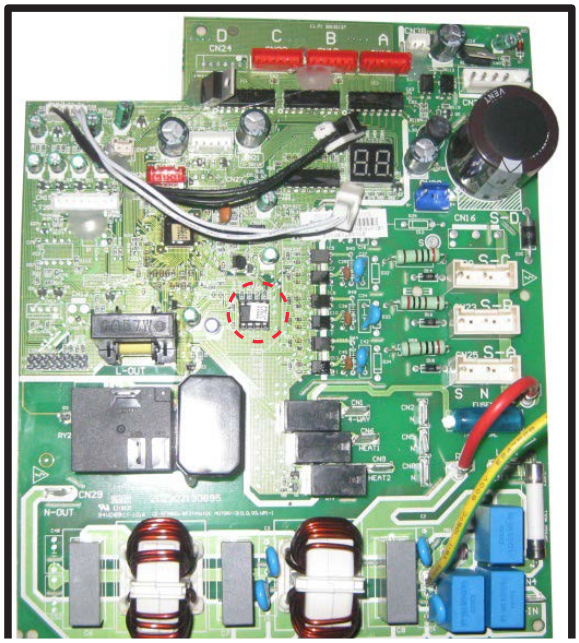
Description:	Compressor discharge temperature sensor error
General Note:	When the compressor discharge temperature (T5) is more than 239°F (115°C) for 10 seconds, the compressor will stop and restart once T5 is less than 194°F (90°C).



5.13. Error Code: F4

Description:	Outdoor EEPROM error.
General Note:	Main outdoor control board main chip is not receiving feedback from EEPROM chip. For the location of EEPROM chip, please refer to the below image.

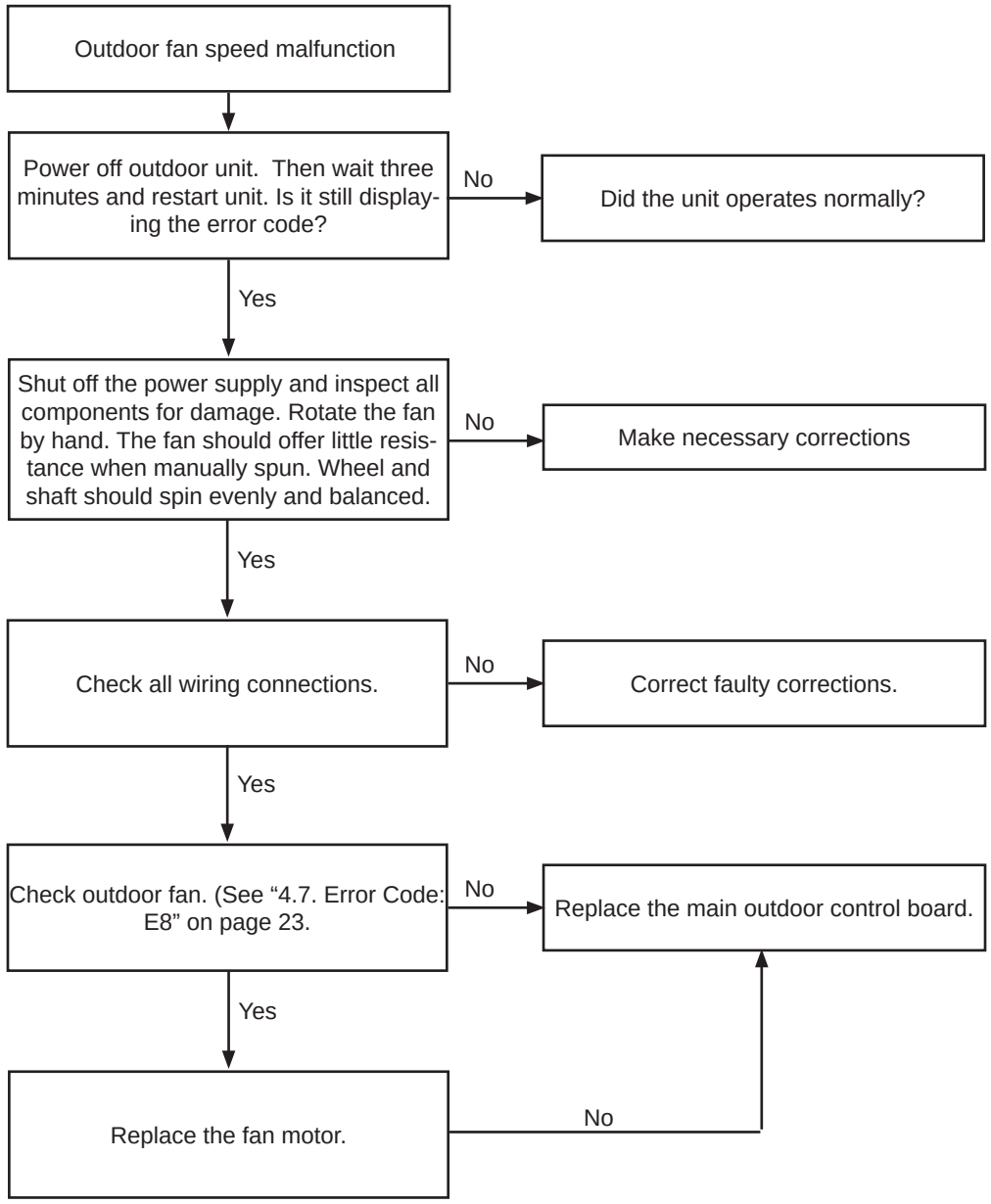




Outdoor PCB(M3OC-30HRFN1-M)

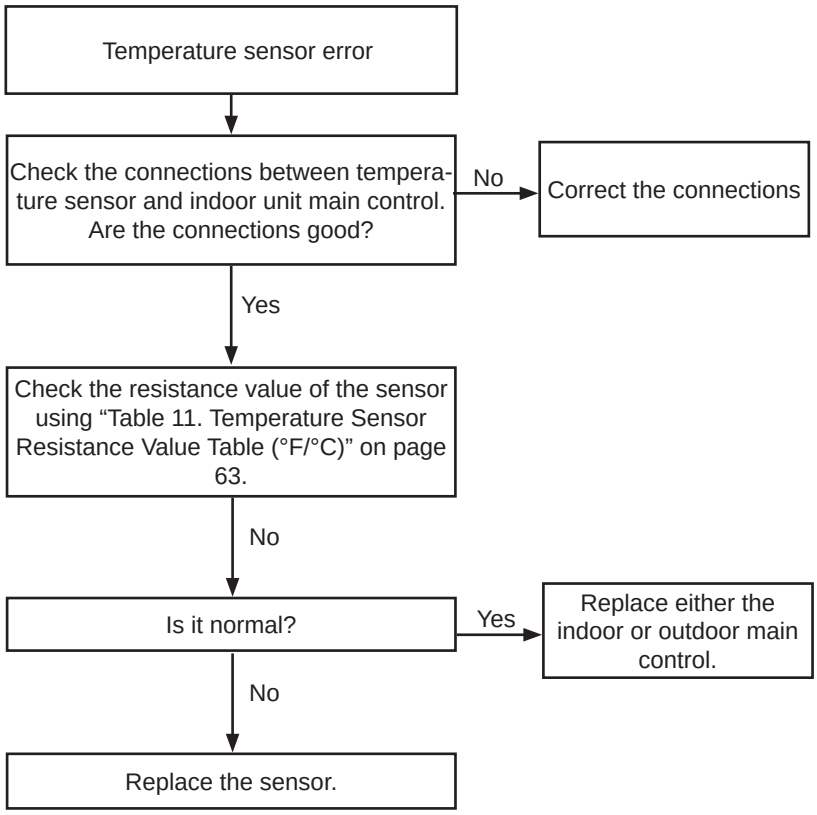
5.14. Error Code: F5

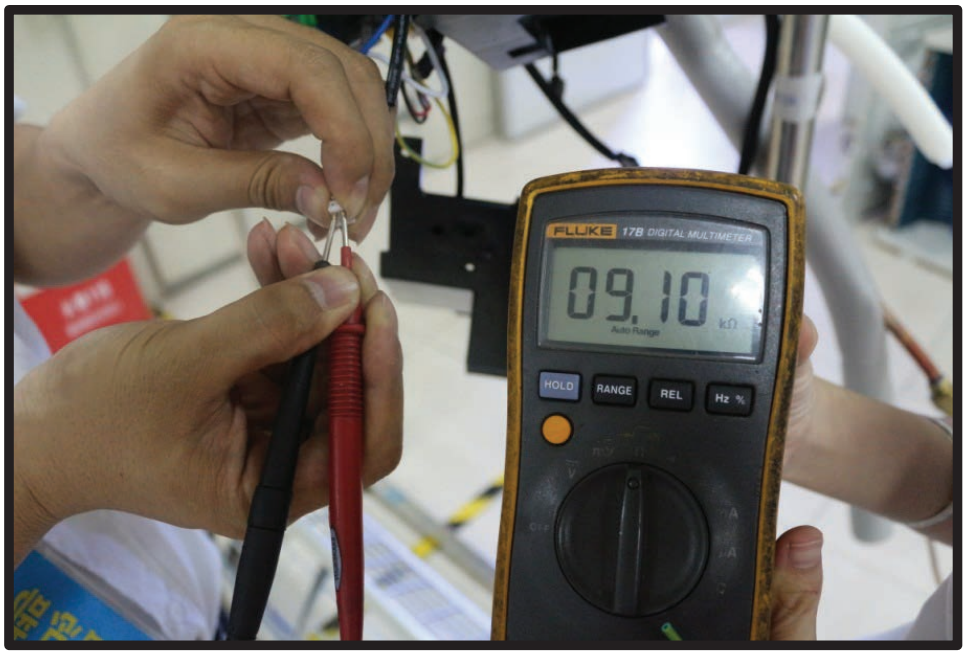
Description:	Outdoor unit fan speed error
General Note:	When outdoor fan speed is to slow (300 RPM) or too fast (2400 RPM) for a predefined amount of time. The unit will stop and the LED will display the failure.



5.15. Error Code: F6

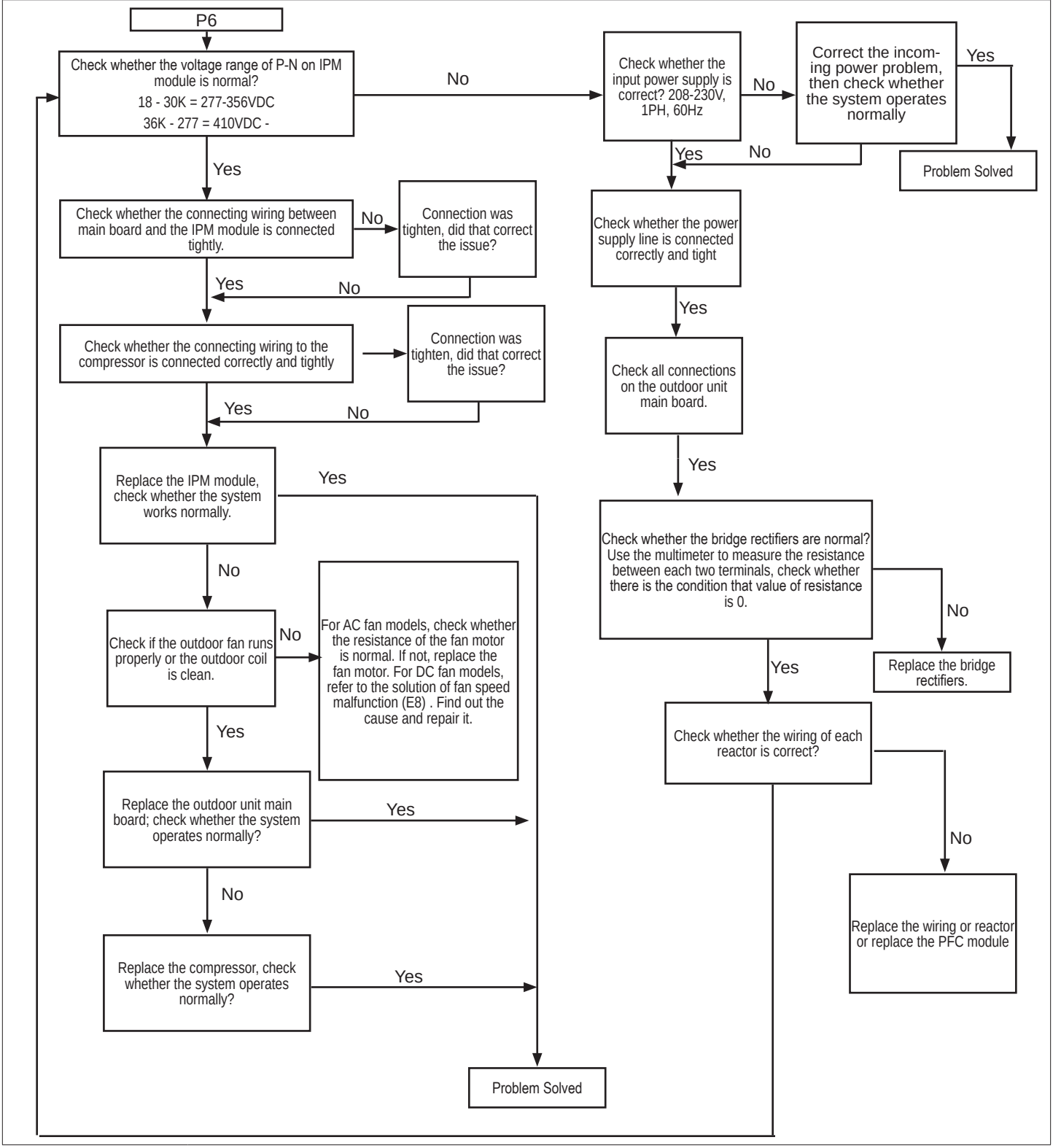
Description:	Indoor Unit Evaporator Outlet Coil Temperature (T2) Sensor Faulty
General Note:	If the voltage is lower than 0.06V or higher than 4.94V, the LED will display the error.



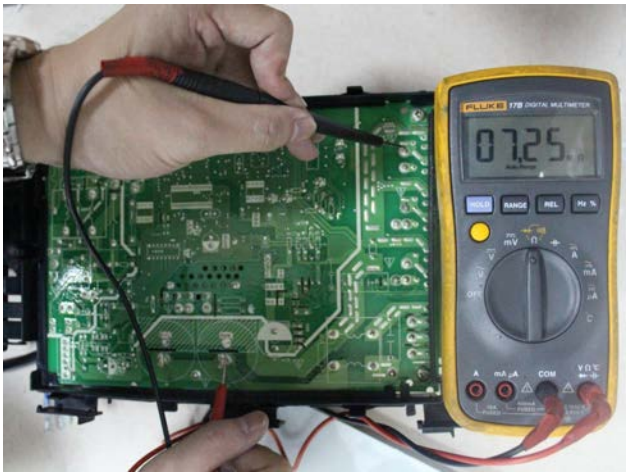


5.16. Error Code: P0

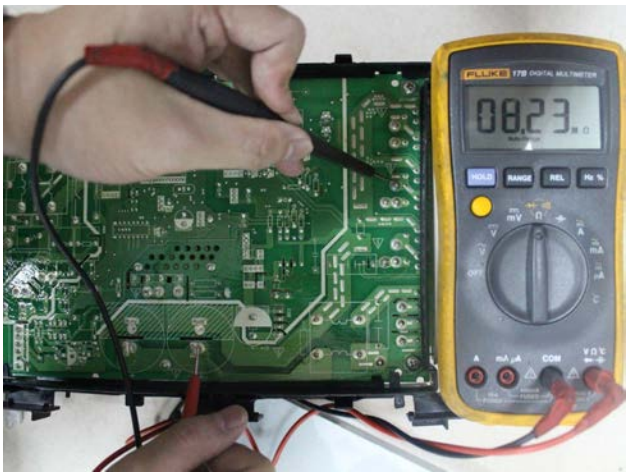
Description:	Integrate Power Module (IPM) module or Insulated gate bipolar transistor (IGBT) over current protection.
General Note:	When the voltage signal that IPM sends to the compressor drive chip is abnormal, the display LED will show “P6” and unit will turn Off.



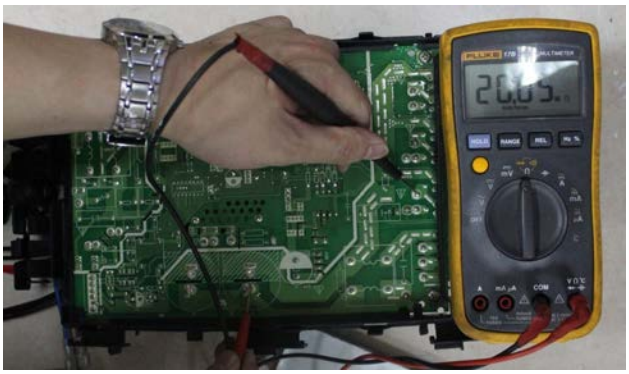
Error Code:	P0 (continued)



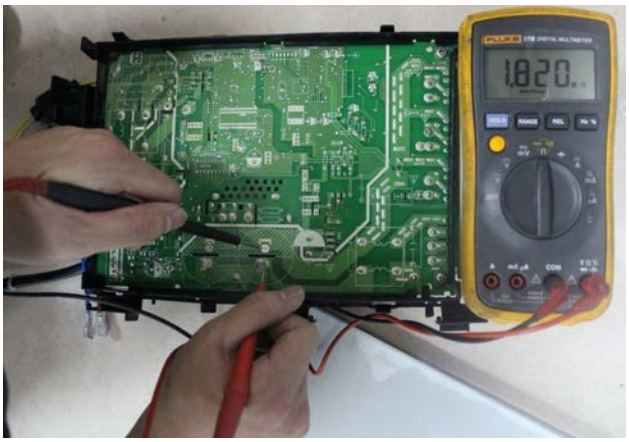
P-U



P-V



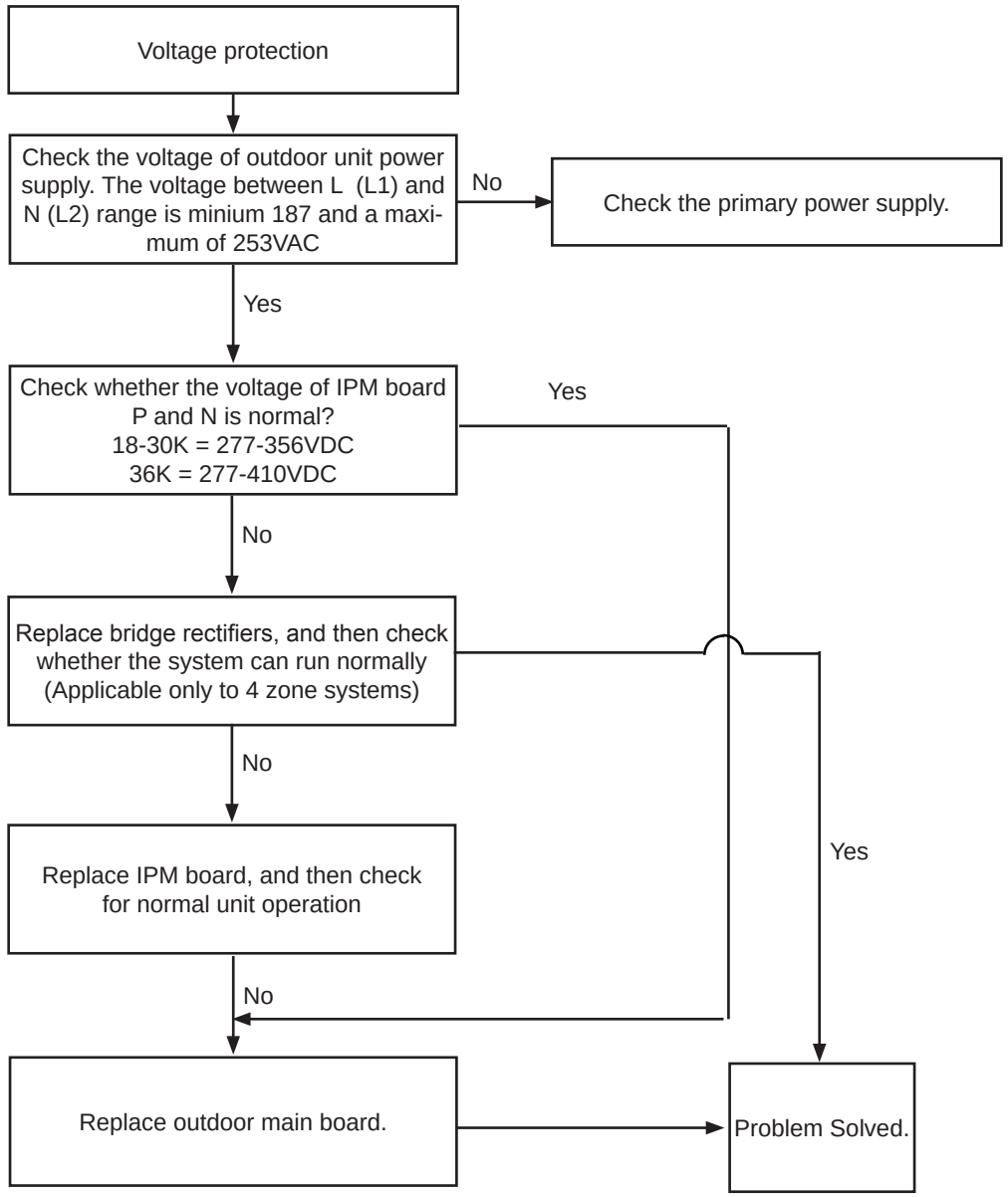
P-W



P-N

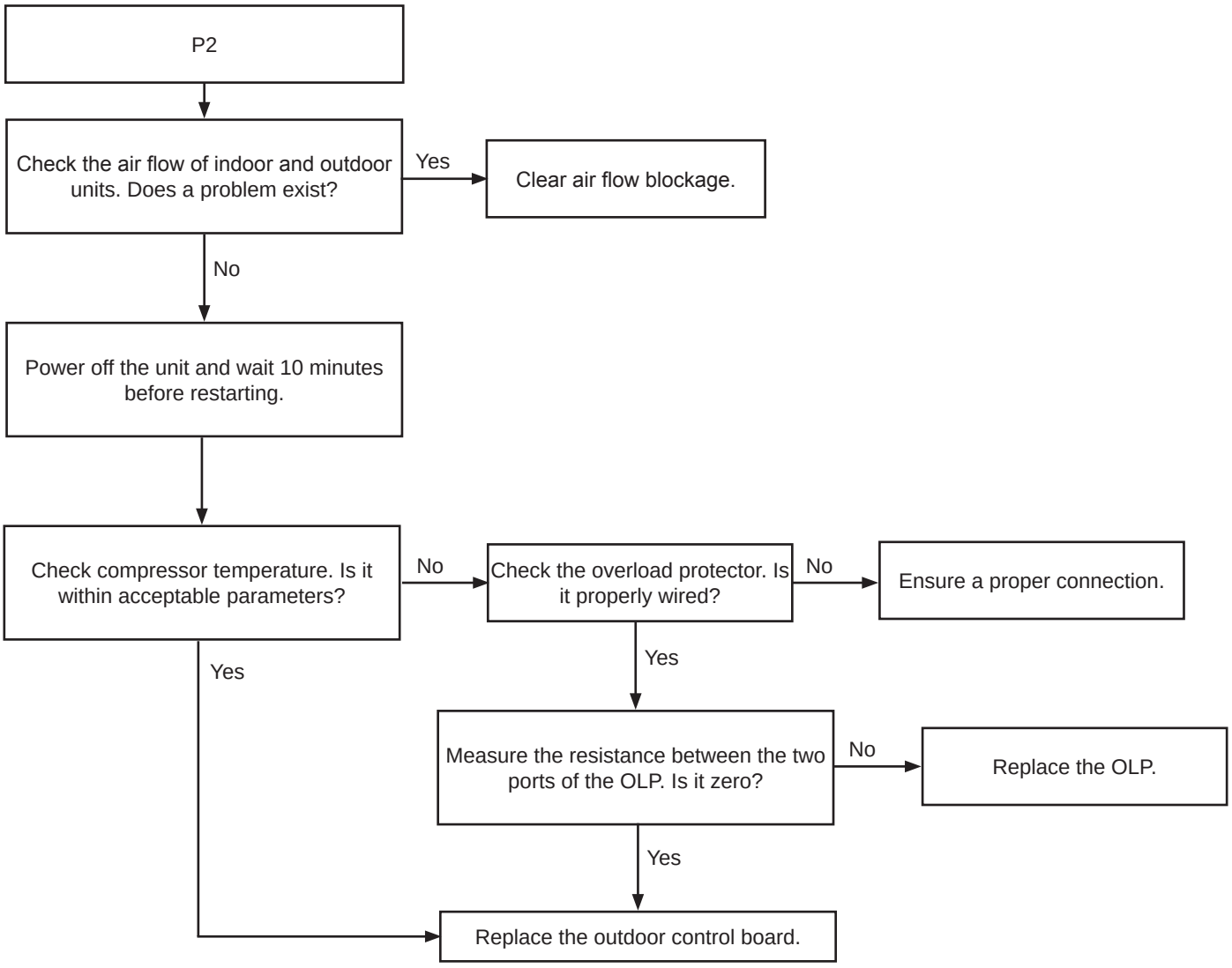
5.17. Error Code: P1

Description:	High or Low voltage protection
General Note:	An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit.



5.18. Error Code: P2

Description:	Compressor top high temperature protection (OLP)
General Note:	If the sampling voltage is not 5V, the LED will display the P2 error code.

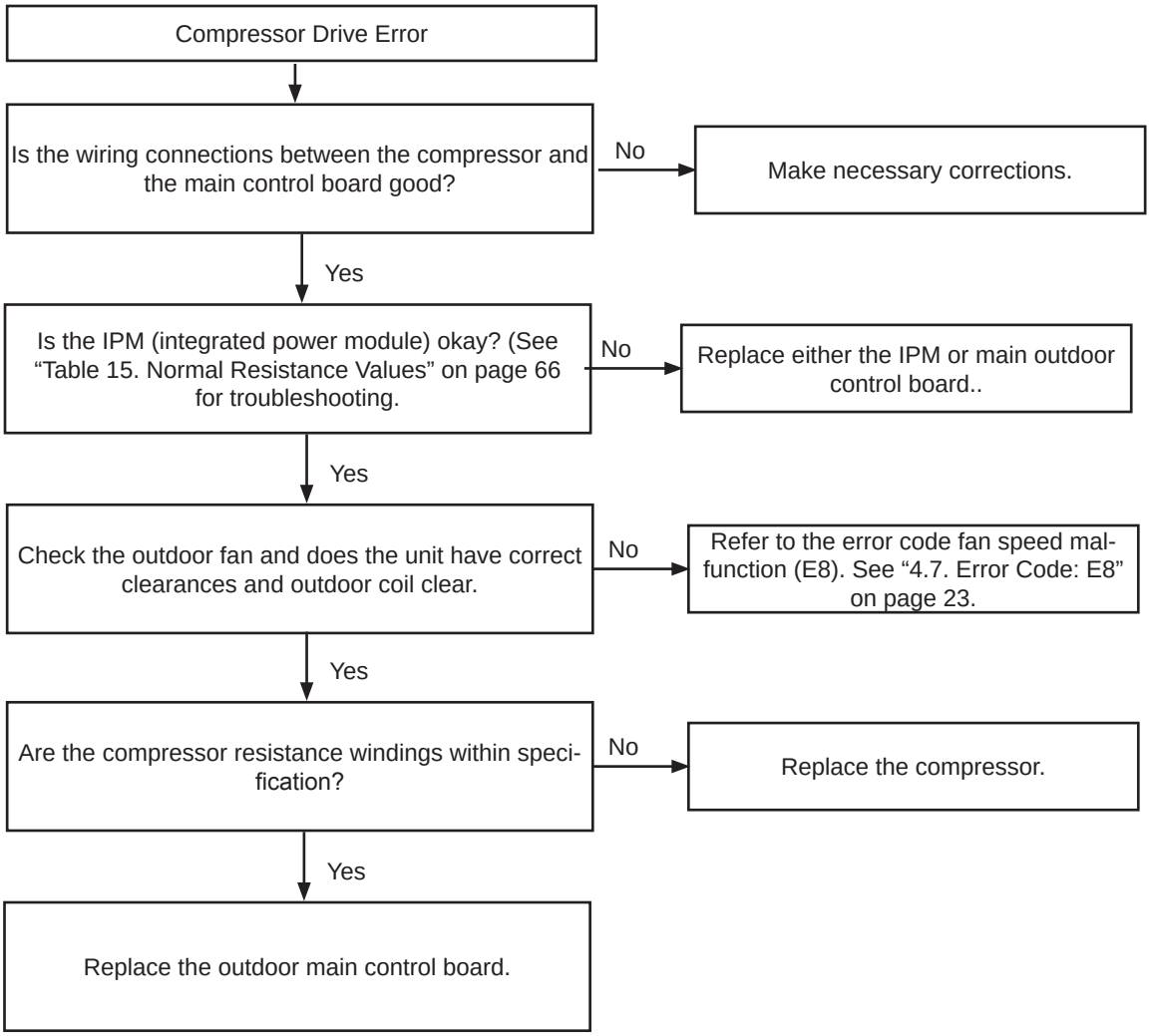


5.19. Error Code: P3

Description:	Outdoor unit low temperature lockout.
General Note:	The outdoor unit will lockout in heating mode when the outdoor temperature is lower than -13°F (-25°C) for one hour, on MPA and MPB units. For MLA unit the lockout occurs at -22 F. The outdoor unit will resume operation when either: • Outdoor temperature is higher than -7.6°F (-22°C) for 10 minutes and compressor has been stopped for one hour • Outdoor temperature is higher than 23°F (-5°C) for 10 minutes

5.20. Error Code: P4

Description:	Compressor Drive Error
General Note:	An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and etc



5.21. Error Code: P5

Description:	Mode conflict.
General Note:	The indoor units cannot work cooling mode and heating mode at the same time in multi-zone applications. Heating mode has priority. • Suppose indoor unit A working in cooling mode or fan mode, and indoor unit B is set to heating mode, then A will change to Off and B will work in heating mode. • Suppose indoor unit A working in heating mode, and indoor unit B is set to cooling mode or fan mode, then B will change to stand by and A will be no change.

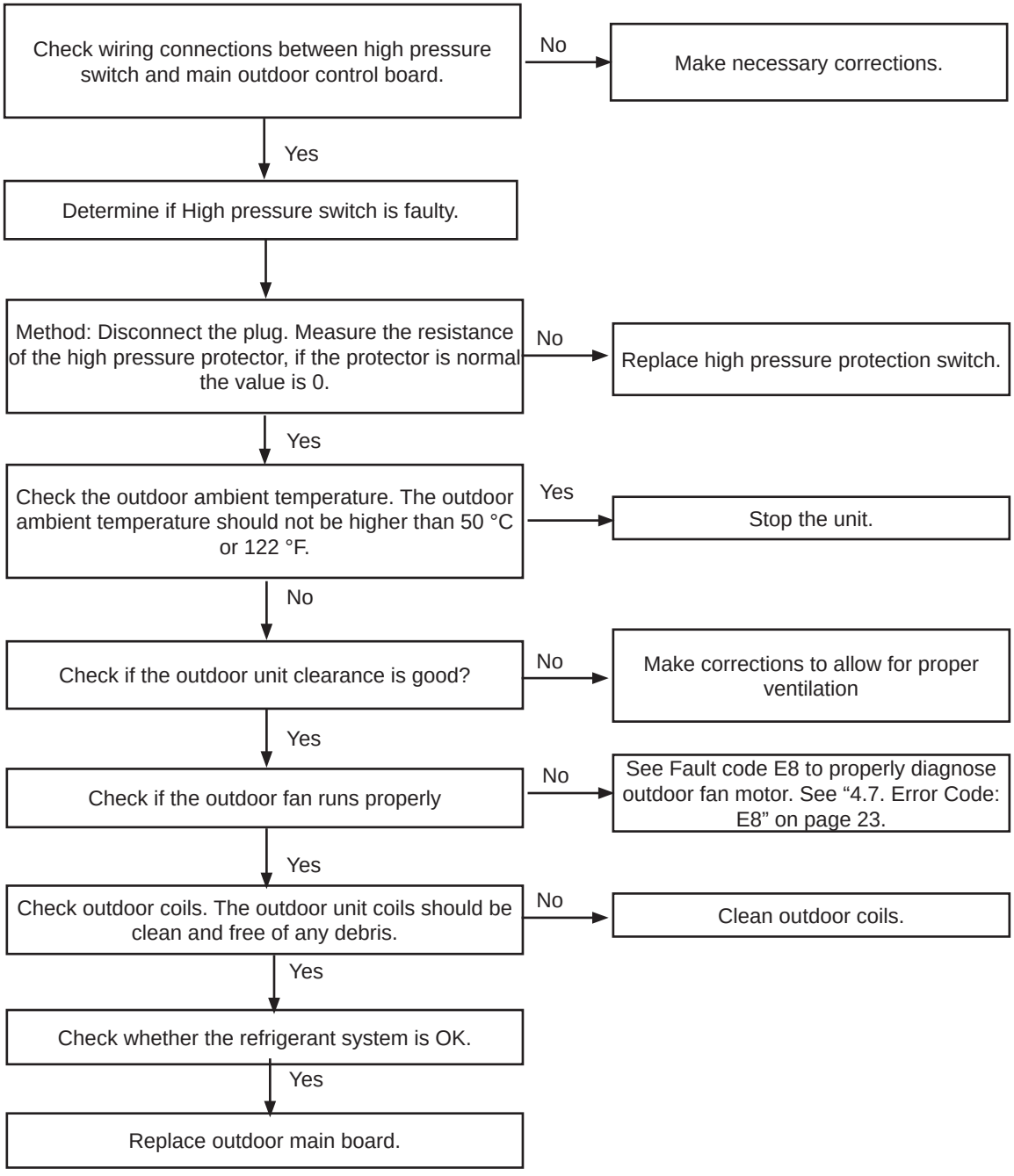
	Cooling mode	Heating mode	Fan	Off
Cooling Mode	No	Yes	No	No
Heating Mode	Yes	No	Yes	No
Fan	No	Yes	No	No
Off	No	No	No	No

No = No mode conflict.

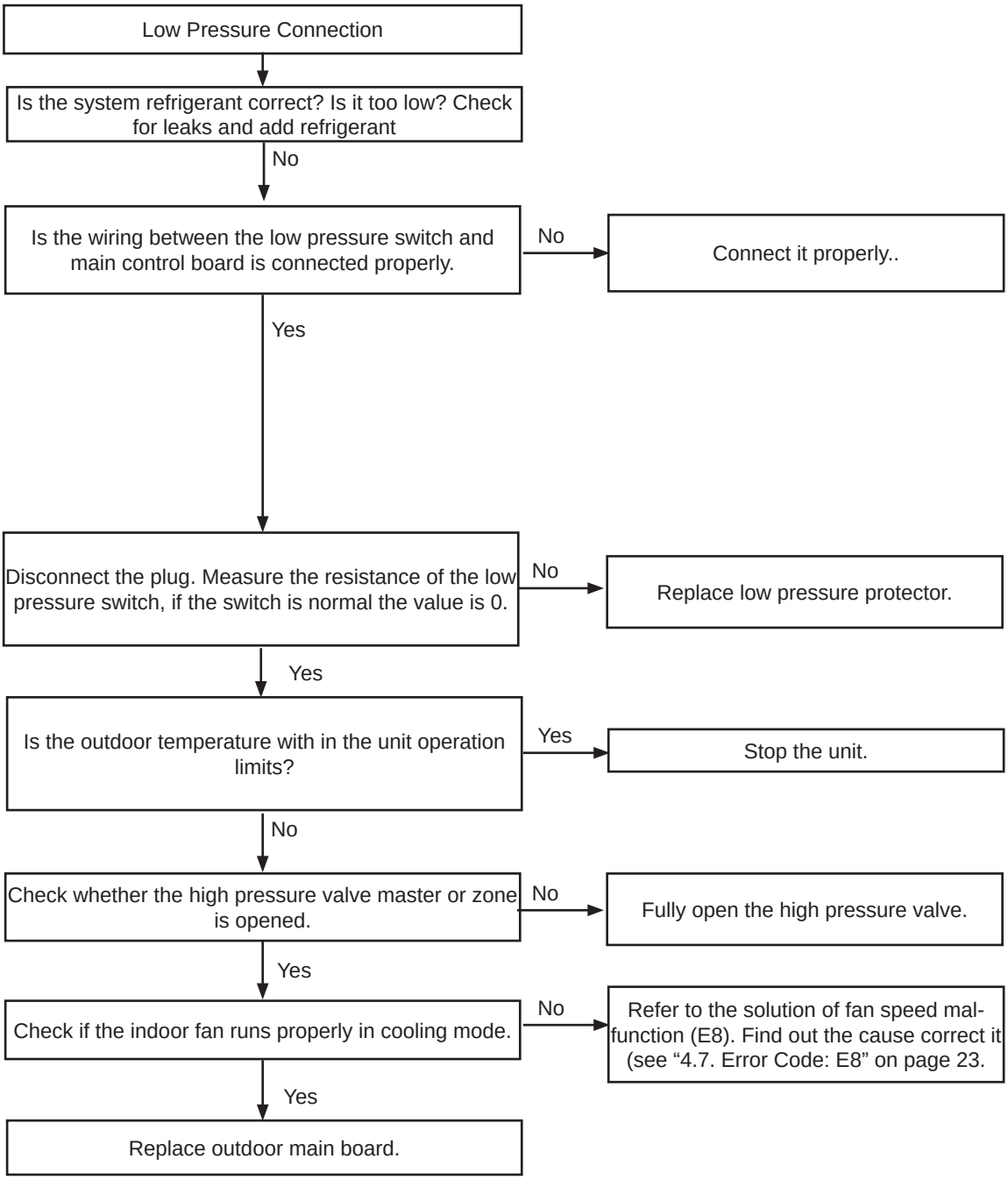
Yes = Mode conflict

5.22. Error Code: P6

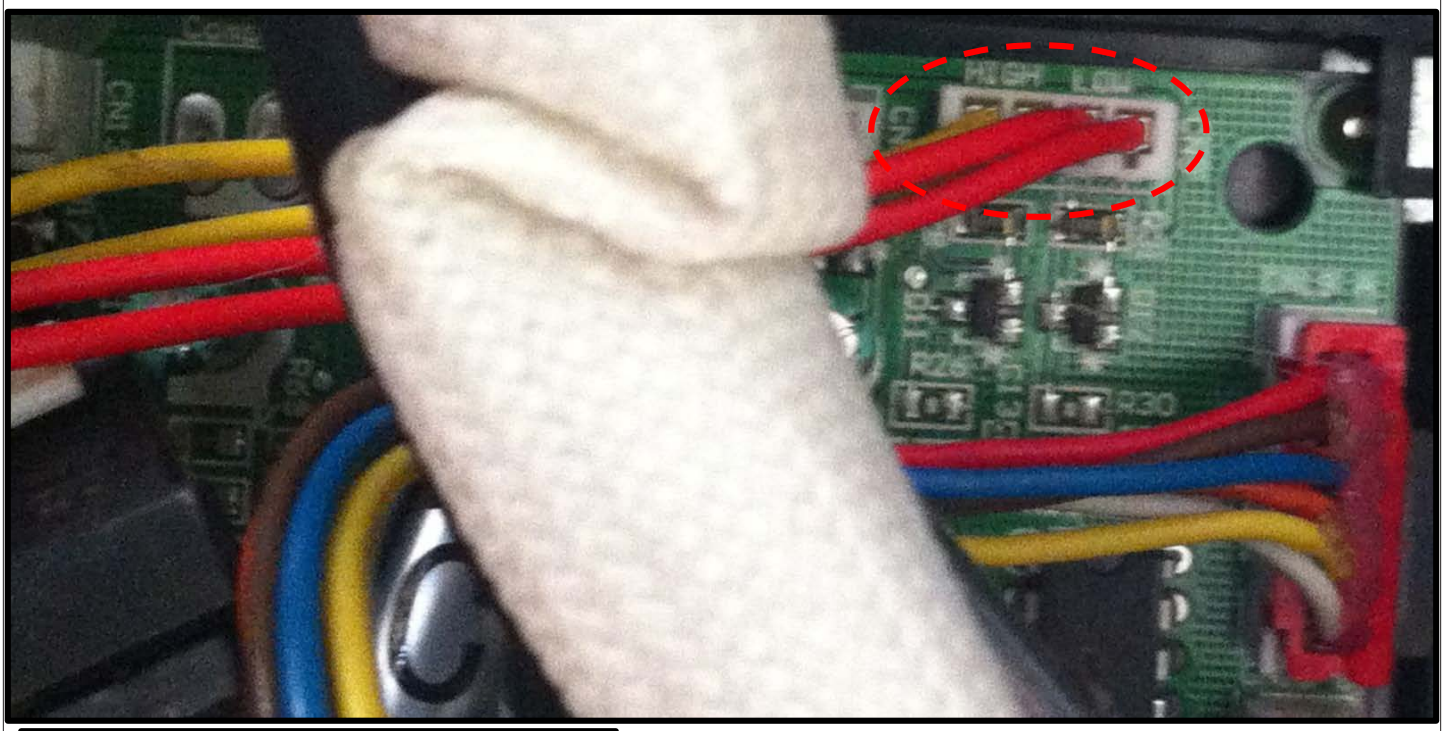
Description:	Compressor high-pressure or low-pressure switch open
General Note:	If the sampling voltage of pressure switch is not 5V, the LED will display the failure. Test each pressure switch separately following the two provided flow charts.

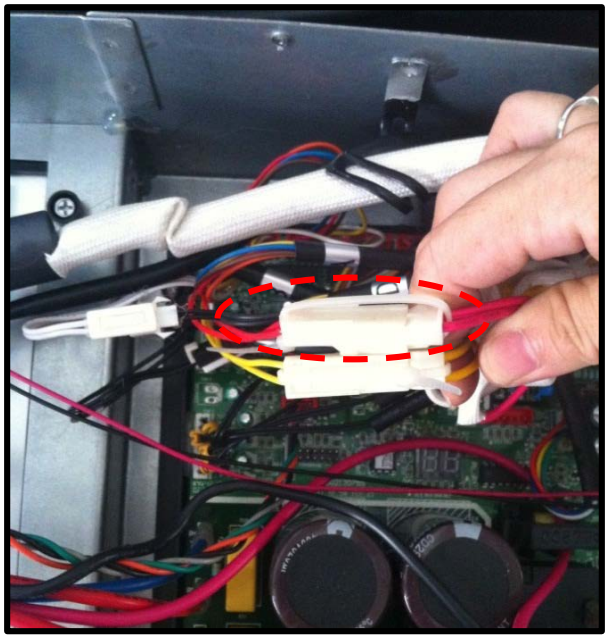


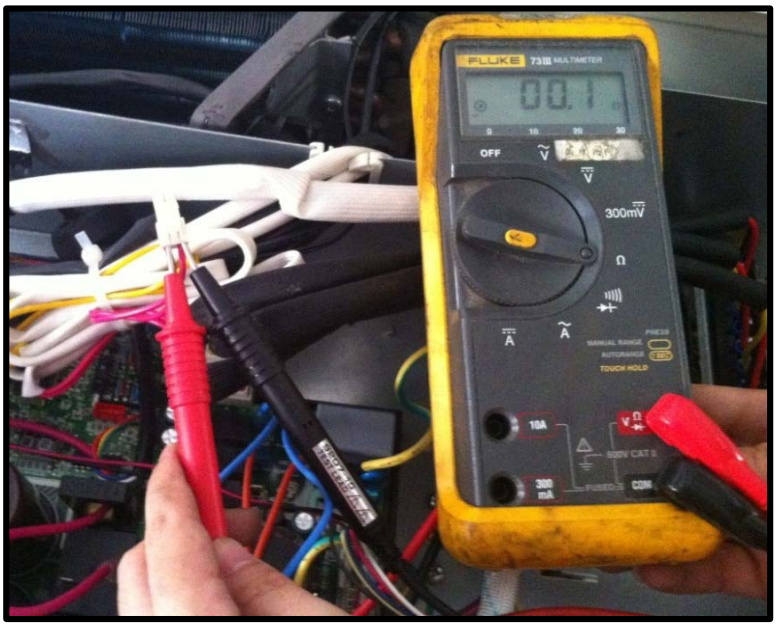
Error Code:	P6 (continued)



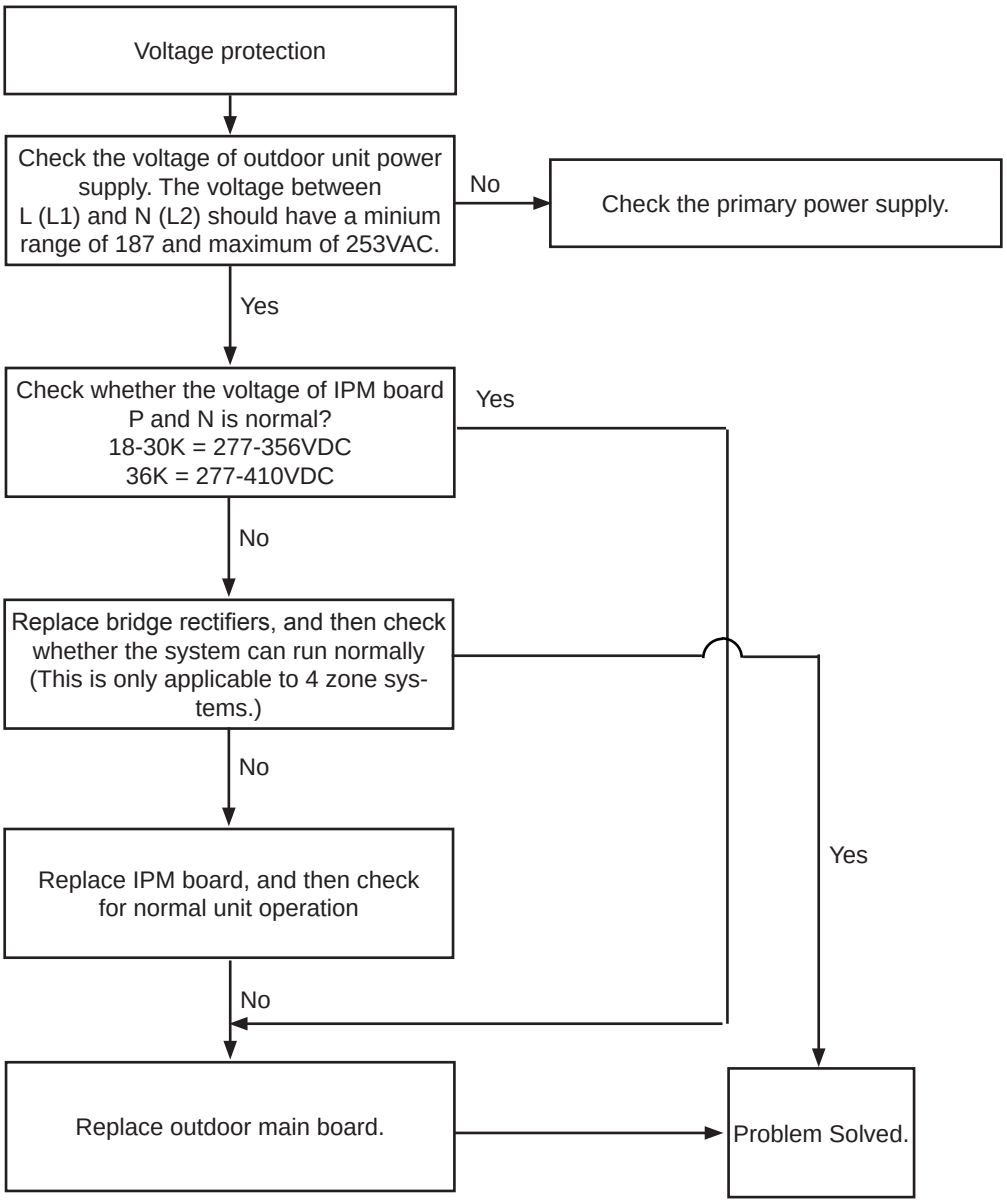
Error Code:	P6 (continued)







6. Over-Voltage or Under-Voltage Protection Diagnosis and Solution



7. Temperature Sensor Resistance Values

Table 11. Temperature Sensor Resistance Value Table (°F/°C)

°F	°C	K Ohm	°F	°C	K Ohm	°F	°C	K Ohm	°F	°C	K Ohm
-4	-20	115.266	68	20	12.6431	140	60	2.35774	212	100	0.62973
-2.2	-19	108.146	69.8	21	12.0561	141.8	61	2.27249	213.8	101	0.61148
-0.4	-18	101.517	71.6	22	11.5	143.6	62	2.19073	215.6	102	0.59386
1.4	-17	96.3423	73.4	23	10.9731	145.4	63	2.11241	217.4	103	0.57683
3.2	-16	89.5865	75.2	24	10.4736	147.2	64	2.03732	219.2	104	0.56038
5	-15	84.219	77	25	10	149	65	1.96532	221	105	0.54448
6.8	-14	79.311	78.8	26	9.55074	150.8	66	1.89627	222.8	106	0.52912
8.6	-13	74.536	80.6	27	9.12445	152.6	67	1.83003	224.6	107	0.51426
10.4	-12	70.1698	82.4	28	8.71983	154.4	68	1.76647	226.4	108	0.49989
12.2	-11	66.0898	84.2	29	8.33566	156.2	69	1.70547	228.2	109	0.486
14	-10	62.2756	86	30	7.97078	158	70	1.64691	230	110	0.47256
15.8	-9	58.7079	87.8	31	7.62411	159.8	71	1.59068	231.8	111	0.45957
17.6	-8	56.3694	89.6	32	7.29464	161.6	72	1.53668	233.6	112	0.44699
19.4	-7	52.2438	91.4	33	6.98142	163.4	73	1.48481	235.4	113	0.43482
21.2	-6	49.3161	93.2	34	6.68355	165.2	74	1.43498	237.2	114	0.42304
23	-5	46.5725	95	35	6.40021	167	75	1.38703	239	115	0.41164
24.8	-4	44	96.8	36	6.13059	168.8	76	1.34105	240.8	116	0.4006
26.6	-3	41.5878	98.6	37	5.87359	170.6	77	1.29078	242.6	117	0.38991
28.4	-2	39.8239	100.4	38	5.62961	172.4	78	1.25423	244.4	118	0.37956
30.2	-1	37.1988	102.2	39	5.39689	174.2	79	1.2133	246.2	119	0.36954
32	0	35.2024	104	40	5.17519	176	80	1.17393	248	120	0.35982
33.8	1	33.3269	105.8	41	4.96392	177.8	81	1.13604	249.8	121	0.35042
35.6	2	31.5635	107.6	42	4.76253	179.6	82	1.09958	251.6	122	0.3413
37.4	3	29.9058	109.4	43	4.5705	181.4	83	1.06448	253.4	123	0.33246
39.2	4	28.3459	111.2	44	4.38736	183.2	84	1.03069	255.2	124	0.3239
41	5	26.8778	113	45	4.21263	185	85	0.99815	257	125	0.31559
42.8	6	25.4954	114.8	46	4.04589	186.8	86	0.96681	258.8	126	0.30754
44.6	7	24.1932	116.6	47	3.88673	188.6	87	0.93662	260.6	127	0.29974
46.4	8	22.5662	118.4	48	3.73476	190.4	88	0.90753	262.4	128	0.29216
48.2	9	21.8094	120.2	49	3.58962	192.2	89	0.8795	264.2	129	0.28482
50	10	20.7184	122	50	3.45097	194	90	0.85248	266	130	0.2777
51.8	11	19.6891	123.8	51	3.31847	195.8	91	0.82643	267.8	131	0.27078
53.6	12	18.7177	125.6	52	3.19183	197.6	92	0.80132	269.6	132	0.26408
55.4	13	17.8005	127.4	53	3.07075	199.4	93	0.77709	271.4	133	0.25757
57.2	14	16.9341	129.2	54	2.95896	201.2	94	0.75373	273.2	134	0.25125
59	15	16.1156	131	55	2.84421	203	95	0.73119	275	135	0.24512
60.8	16	15.3418	132.8	56	2.73823	204.8	96	0.70944	276.8	136	0.23916
62.6	17	14.6181	134.6	57	2.63682	206.6	97	0.68844	278.6	137	0.23338
64.4	18	13.918	136.4	58	2.53973	208.4	98	0.66818	280.4	138	0.22776
66.2	19	13.2631	138.2	59	2.44677	210.2	99	0.64862	282.2	139	0.22231

8. Discharge Temperature Sensor Resistance Values

Table 12. Discharge Temperature Sensor Table (°C--K)

°F	°C	K Ohm	°F	°C	K Ohm	°F	°C	K Ohm	°F	°C	K Ohm
-4	-20	542.7	68	20	68.66	140	60	13.59	212	100	3.702
-2.2	-19	511.9	69.8	21	65.62	141.8	61	13.11	213.8	101	3.595
-0.4	-18	455.9	71.6	22	59.98	143.6	62	12.21	215.6	102	3.392
1.4	-17	455.9	73.4	23	59.98	145.4	63	12.21	217.4	103	3.392
3.2	-16	430.5	75.2	24	57.37	147.2	64	11.79	219.2	104	3.296
5	-15	406.7	77	25	54.89	149	65	11.38	221	105	3.203
6.8	-14	384.3	78.8	26	52.53	150.8	66	10.99	222.8	106	3.113
8.6	-13	363.3	80.6	27	50.28	152.6	67	10.61	224.6	107	3.025
10.4	-12	343.6	82.4	28	48.14	154.4	68	10.25	226.4	108	2.941
12.2	-11	325.1	84.2	29	46.11	156.2	69	9.902	228.2	109	2.86
14	-10	307.7	86	30	44.17	158	70	9.569	230	110	2.781
15.8	-9	291.3	87.8	31	42.33	159.8	71	9.248	231.8	111	2.704
17.6	-8	275.9	89.6	32	40.57	161.6	72	8.94	233.6	112	2.63
19.4	-7	261.4	91.4	33	38.89	163.4	73	8.643	235.4	113	2.559
21.2	-6	247.8	93.2	34	37.3	165.2	74	8.358	237.2	114	2.489
23	-5	234.9	95	35	35.78	167	75	8.084	239	115	2.422
24.8	-4	222.8	96.8	36	34.32	168.8	76	7.82	240.8	116	2.357
26.6	-3	211.4	98.6	37	32.94	170.6	77	7.566	242.6	117	2.294
28.4	-2	200.7	100.4	38	31.62	172.4	78	7.321	244.4	118	2.233
30.2	-1	190.5	102.2	39	30.36	174.2	79	7.086	246.2	119	2.174
32	0	180.9	104	40	29.15	176	80	6.859	248	120	2.117
33.8	1	171.9	105.8	41	28	177.8	81	6.641	249.8	121	2.061
35.6	2	163.3	107.6	42	26.9	179.6	82	6.43	251.6	122	2.007
37.4	3	155.2	109.4	43	25.86	181.4	83	6.228	253.4	123	1.955
39.2	4	147.6	111.2	44	24.85	183.2	84	6.033	255.2	124	1.905
41	5	140.4	113	45	23.89	185	85	5.844	257	125	1.856
42.8	6	133.5	114.8	46	22.89	186.8	86	5.663	258.8	126	1.808
44.6	7	127.1	116.6	47	22.1	188.6	87	5.488	260.6	127	1.762
46.4	8	121	118.4	48	21.26	190.4	88	5.32	262.4	128	1.717
48.2	9	115.2	120.2	49	20.46	192.2	89	5.157	264.2	129	1.674
50	10	109.8	122	50	19.69	194	90	5	266	130	1.632
51.8	11	104.6	123.8	51	18.96	195.8	91	4.849			
53.6	12	99.69	125.6	52	18.26	197.6	92	4.703			
55.4	13	95.05	127.4	53	17.58	199.4	93	4.562			
57.2	14	90.66	129.2	54	16.94	201.2	94	4.426			
59	15	86.49	131	55	16.32	203	95	4.294		B(25/50)=3950K	
60.8	16	82.54	132.8	56	15.73	204.8	96	4.167			
62.6	17	78.79	134.6	57	15.16	206.6	97	4.045		R(90°C)=5KΩ±3%	
64.4	18	75.24	136.4	58	14.62	208.4	98	3.927			
66.2	19	71.86	138.2	59		210.2	99	3.812			

9. Temperature Sensor Identification Table

Table 13. Temperature Sensor Identification Table

Sensor Number	Sensor Name
T1	ID Return Air
T2	Indoor Coil
T2B	Coil temperature of indoor heat exchanger outlet. (Located in outdoor unit)
T3	Outdoor Coil
T4	OD ambient temp
T5	Compressor Discharge

10. Component Diagnostics

10.1. Compressor Check

Measure the resistance value of each winding by using the tester. This can also be used to check for shorted compressor windings, and identifying terminals when they are no longer legible.

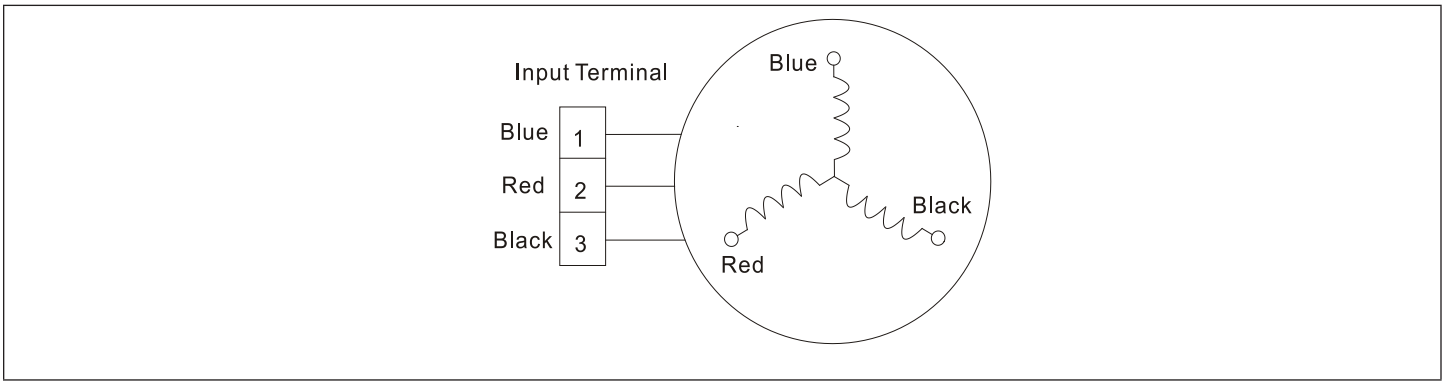


Figure 4. Compressor Terminals

Table 14. Model / Compressor Cross-Reference

ODU Model #	Compressor Model #	Blue - Red	Blue - Black	Red - Blue
MPA012S4S-1L MPA012S4S-1P	ASM108D1UFZA	1.81Ω (20°C /68°F)		
MPB009S4S-1L MPB012S4S-1L	ASM98D32UFZ	2.25 Ω (20°C /68°F)		
MPB009S4S-1P	ASN98D22UFZ	1.57 Ω (20°C /68°F)		
MPB012S4S-1P	ASN98D22UFZ	2.25 Ω (20°C /68°F)		
MPA009S4S-1L MPA009S4S-1P	ASM98D1UFZA	1.81Ω (20°C /68°F)		
MPA018S4S-1P	ASM135D23UFZ	1.75Ω (20°C /68°F)		
MPB018S4S-1P	ASM135D23UFZ	1.65 Ω (20°C /68°F)		
MPA024S4S-1P	DA250S2C-30MT	0.55Ω (20°C /68°F)		
MPB024S4S-1P	ATF235D22UMT	0.75 Ω (20°C /68°F)		
MPA030S4S-1P	TNB306FPGMC-L	0.53Ω (20°C /68°F)		
MPB030S4S-1P	ATF250D22UMT	0.65 Ω (20°C /68°F)		
MPA036S4S-1P	TNB306FPGMC-L	0.53Ω (20°C /68°F)		
MPB036S4S-1P	ATF310D43UMT	0.65 Ω (20°C /68°F)		
MPA048S4S-1P	MNB36FAAMC-L	0.44Ω (20°C /68°F)		
MPB048S4S-1P	ATQ420D1UMU	0.378 Ω (20°C /68°F)		
MPA018S4M-1P	DA150S1C-20FZ	0.95Ω (20°C /68°F)		
MPB018S4M-1P	ATM150D23UFZ	1.72 Ω (20°C /68°F)		
MPA030S4M-1P	DA250S2C-30MT	0.55Ω (20°C /68°F)		
MPB030S4M-1P	ATF235D22UMT	0.75 Ω (20°C /68°F)		
MPA036S4M-1P	TNB306FPGMC-L	0.53Ω (20°C /68°F)		
MPB036S4M-1P	ATF310D43UMT	0.65 Ω (20°C /68°F)		
MPA048S4M-1P	MNB36FAAMC-L	0.44Ω (20°C /68°F)		
MPB048S4M-1P	ATQ360D1UMU	0.37 Ω (20°C /68°F)		
MLA009S4S-1P MLA012S4S-1P	ATM115D43UFZ2	1.87 Ω		
MLA018S4S-1P MLA024S4S-1P	ATF235D22UMT	0.75 Ω		

Table 14. Model / Compressor Cross-Reference

ODU Model #	Compressor Model #	Blue - Red	Blue - Black	Red - Blue
MLA018S4M-1P	ATF235D22UMT	0.75 Ω		
MLA030S4M-1P	ATF310D43UMT	0.65 Ω		
MLA036S4M-1P	ATQ360D1UMU	0.37 Ω		

10.2. IPM Check

Measure the resistance value of each winding by using the tester.

Turn off the power, let the large capacity electrolytic capacitors discharge completely, and unplug the IPM. Use a digital tester to measure the resistance between P and UVWN; UVW and N.

Table 15. Normal Resistance Values

Digital Tester		Normal Resistance Value	Digital Tester		Normal Resistance Value
(+)Red	(-)Black		(+)Red	(-)Black	
P	N	∞ (Several MΩ)	U	N	∞ (Several MΩ)
	U		V		
	V		W		
	W		(+)Red		

NOTE:*Any Meg ohm reading is good*

Figure 5. Testing

10.3. Fan Motors

10.3.1. AC Fan Motor

Power on and set the unit running in fan mode at high fan speed. After running for 15 seconds, measure the voltage of pin 1 and pin 2. If the value of the voltage is less than 100V (208~240V power supply) or 50V(115V power supply), the main control board may have issues and will need to be replaced.

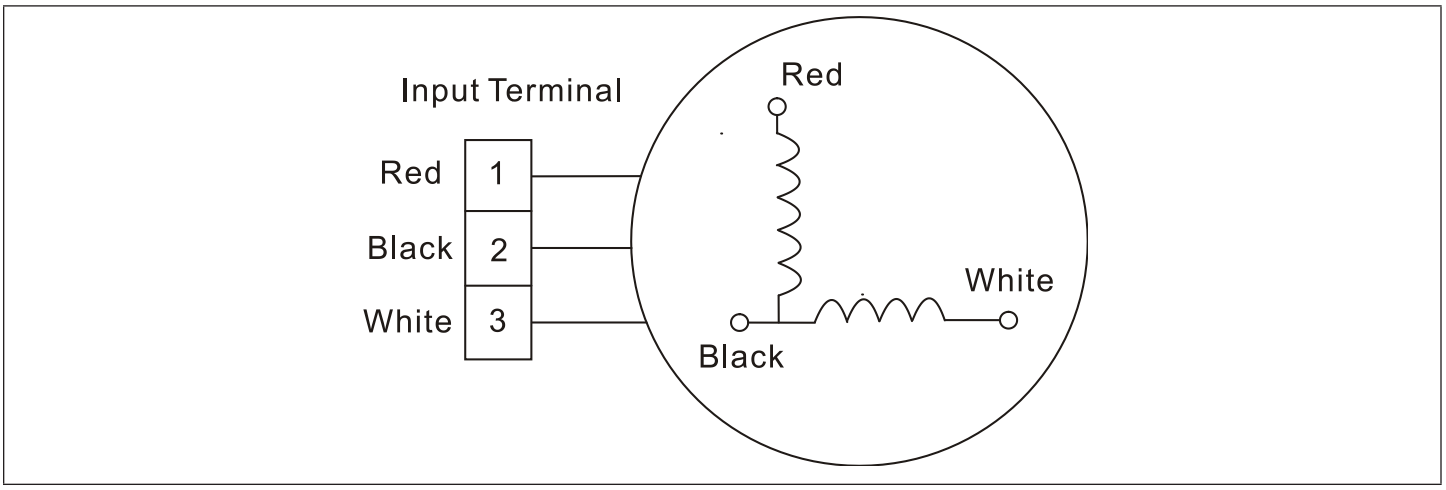


Figure 6. Terminals

Table 16. Resistance Value for AC or DC Fan Motors

Position	Resistance Value			
	RPG20B		RPG28H	
Black - Red	381Ω±8% (20°C) (Brand: Weiling)	342Ω±8% (20°C) (Brand: Dayang)	183.6Ω±8% (20°C) (Brand: Weiling)	180Ω±8% (20°C) (Brand: Wolong)
White - Black	267Ω±8% (20°C) (Brand: Weiling)	253Ω±8% (20°C) (Brand: Dayang)	206Ω±8% (20°C) (Brand: Weiling)	190Ω±8% (20°C) (Brand: Wolong)

Measure the resistance value of each winding by using the tester

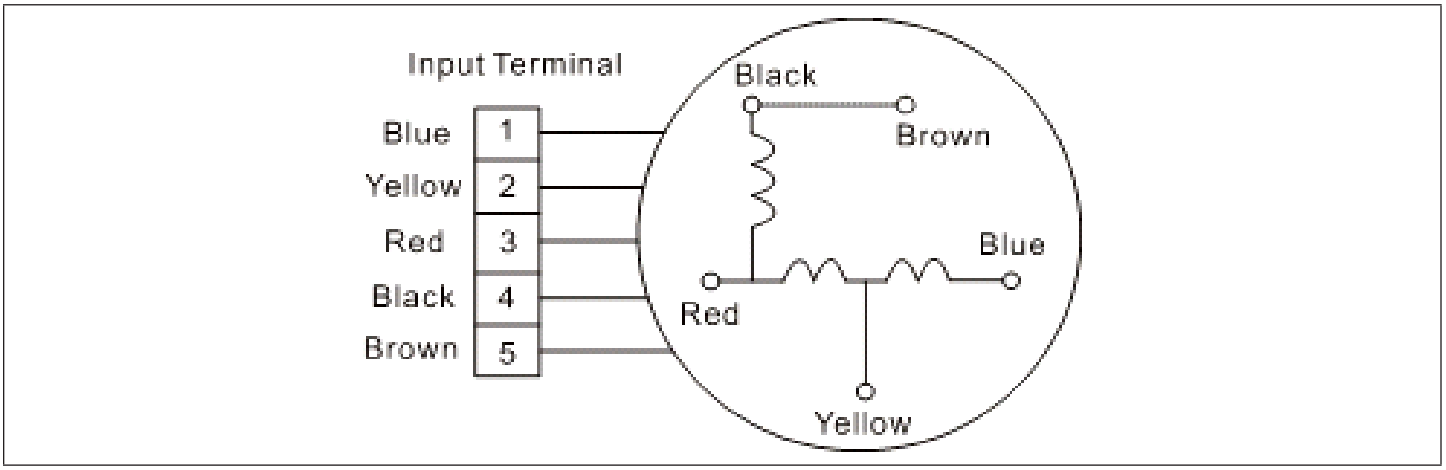


Figure 7. Terminals

Table 17. Resistance Values for DC Fan Motors

Position	Resistance Value						
	YDK70-6FB	YDK180-8GB	YSK27-4G	YSK68-4B	YDK45-6B	YSK25-6L	YDK53-6FB(B)
Black - Red	56Ω±8% (20°C)	24.5Ω±8% (20°C)	317Ω±8% (20°C)	145Ω±8% (20°C)	345Ω±8% (20°C)	627Ω±8% (20°C)	88.5Ω±8% (20°C)
Red - Yellow	76Ω±8% (20°C)	19Ω±8% (20°C)	252Ω±8% (20°C)	88Ω±8% (20°C)	150Ω±8% (20°C)	374.3Ω±8% (20°C)	138Ω±8% (20°C)
Yellow - Blue	76Ω±8% (20°C)	19Ω±8% (20°C)	252Ω±8% (20°C)	88Ω±8% (20°C)	150Ω±8% (20°C)	374.3Ω±8% (20°C)	138Ω±8% (20°C)

Table 18. Resistance Value for DC Fan Motors

Unit	Product	Capacity	Voltage	LENNOX model	Catalog Number	Part Number	Motor Model	**Resistance (Ω)**
IDU	Ducted	9K	208-230V	MMDA009S4-1P	14A23	22023011000630	ZKFN-55-8-1	46.5
IDU	Ducted	12K	208-230V	MMDA012S4-1P	14A24	22023011000631	ZKFN-55-8-1	46.5
IDU	Ducted	18K	208-230V	MMDA018S4-1P	14A25	22023011000632	ZKFN-90-8-1	43
IDU	Ducted	24K	208-230V	MMDA024S4-1P	14A26	22023011000633	ZKFN-90-8-1	43
IDU	Ducted	9K	208-230V	MMDA009S4-2P	15V30	22023011000630	ZKFN-55-8-1	46.5
IDU	Ducted	12K	208-230V	MMDA012S4-2P	15V31	22023011000631	ZKFN-55-8-1	46.5
IDU	Ducted	18K	208-230V	MMDA018S4-2P	15V32	22023011000632	ZKFN-90-8-1	43
IDU	Ducted	24K	208-230V	MMDA024S4-2P	15V33	22023011000633	ZKFN-90-8-1	43
IDU	Ducted	36K	208-230V	MMDA036S4-1P	14A27	22023011000519	ZKFN-150-8-1	30
IDU	Ducted	48K	208-230V	MMDA048S4-1P	14A28	22023011000450	ZKFN-240-8-1	10.2
IDU	Ducted	9K	208-230V	MMD	16H58	22023011003874	ZKFN-55-8-22	46.5
IDU	Ducted	12K	208-230V	MMD	16H59	22023011003875	ZKFN-55-8-22	46.5
IDU	Ducted	18K	208-230V	MMD	16H60	22023011003474	ZKFN-160-8-1-2	17.8
IDU	Ducted	24K	208-230V	MMD	16H61	22023011003414	ZKFN-160-8-1-2	17.8
IDU	Ducted	36K	208-230V	MMD	16H62	22023011003415	ZKFN-300-8-1	6.74
IDU	Ducted	48K	208-230V	MMD	16H63	22023011003416	ZKFN-560-8-1-1	4
IDU	Ceiling-flooring	18K	208-230V	MCFB018S4-2P	15U56	22022711000996	ZKFN-55-8-1	46.5
IDU	Ceiling-flooring	24K	208-230V	MCFA024S4-1P	14A31	22022711000421	ZKFN-55-8-1	46.5
IDU	Ceiling-flooring	24K	208-230V	MCFA024S4-2P	15V34	22022711000421	ZKFN-55-8-1	46.5
IDU	Ceiling-flooring	36K	208-230V	MCFA036S4-1P	14A32	22022711000659	ZKFN-115-8-1	42
IDU	Ceiling-flooring	48K	208-230V	MCFA048S4-1P	14A33	22022711000658	ZKFN-90-8-1	43
IDU	Casstte	48K	208-230V	M33B048S4-1P	15U55	22022511001716	ZKFN-170-8-1	22
ODU	Standard SZ	9K	115V	MPB009S4S-1L	15U57	22022016006440	ZKFN-40-8-1L	100
ODU	Standard SZ	12K	115V	MPB012S4S-1L	15U41	22022016006439	ZKFN-40-8-1L	100
ODU	Standard SZ	9K	208-230V	MPB009S4S-1P	15U42	22022016005160	ZKFN-40-8-1L	100
ODU	Standard SZ	12K	208-230V	MPB012S4S-1P	15U43	22022016005161	ZKFN-40-8-1L	100
ODU	Standard SZ	18K	208-230V	MPB018S4S-1P	15U44	22022016005162	ZKFN-50-8-2	37.3
ODU	Standard SZ	24K	208-230V	MPB024S4S-1P	15U45	22022016005121	ZKFN-120-8-2	42
ODU	Standard SZ	30K	208-230V	MPB030S4S-1P	15U46	22022016005119	ZKFN-120-8-2	42

Table 18. Resistance Value for DC Fan Motors

Unit	Product	Capacity	Voltage	LENNOX model	Catalog Number	Part Number	Motor Model	**Resistance (Ω)**
ODU	Standard SZ	36K	208-230V	MP	16H57	22022016005120	ZKFN-120-8-2	42
ODU	Standard SZ	36K	208-230V	MP	15U47	22022516000402	ZKFN-120-8-2	42
ODU	Standard SZ	48K	208-230V	MP	15U50	22022516000702	ZKFN-85-8-22-2	32.3
ODU	Cold climate SZ	9K	208-230V	MLA009S4S-1P	14X75	22022016004895	ZKFN-40-8-1L	100
ODU	Cold climate SZ	12K	208-230V	MLA012S4S-1P	14X76	22022016004875	ZKFN-40-8-1L	100
ODU	Cold climate SZ	18K	208-230V	MLA018S4S-1P	14X77	22022016005062	ZKFN-50-8-2	37.3
ODU	Cold climate SZ	24K	208-230V	MLA024S4S-1P	14X78	32022016000001	ZKFN-120-8-2	42
ODU	Standard multi zone	18K	208-230V	MP	15U48	22022316000385	ZKFN-50-8-2	37.3
ODU	Standard multi zone	30K	208-230V	MP	15U49	22022316000327	ZKFN-120-8-2	42
ODU	Standard multi zone	36K	208-230V	MP	15U40	22022316000326	ZKFN-120-8-2	42
ODU	Standard multi zone	48K	208-230V	MP	15U51	22022316000545	ZKFN-85-8-22-2	32.3
ODU	Cold climate MZ	18K	208-230V	MLA018S4M-1P	14X79	22022316000327	ZKFN-120-8-2	42
ODU	Cold climate MZ	30K	208-230V	MLA030S4M-1P	14X80	22022316000326	ZKFN-120-8-2	42
ODU	Cold climate MZ	36K	208-230V	MLA036S4M-1P	14X81	22022316000545	ZKFN-85-8-22-2	32.3
IDU	Ceiling-flooring	18K	208-230V	MCFA018S4-1P	14A30	22022711000432	ZKFN-55-8-1	46.5
ODU	Current SZ	9K	208-230V	MPA009S4S-1P	14A05	22022016001776	ZKFN-40-8-5	52.5
ODU	Current SZ	12K	208-230V	MPA012S4S-1P	14A06	22022016003852	ZKFN-40-8-5	52.5
ODU	Current SZ	18K	208-230V	MPA018S4S-1P	14A07	22022016002776	ZKFN-50-8-2	37.3
ODU	Current SZ	30K	208-230V	MPA030S4S-1P	14A09	22022016002857	ZKFN-120-8-2	42
ODU	Current SZ	36K	208-230V	MPA036S4S	14A10	22023016000215	ZKFN-120-8-2	42
ODU	Current MZ	36K	208-230V	MPA036S4M	14A36	22022316000128	ZKFN-120-8-2	42

10.3.2. DC Fan Motor (Control Chip is Inside Fan Motor)

Power on and when the unit is in standby, measure the voltage of pin 1 to pin 3, pin 4 to pin 3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the printed circuit board must have problems and needs to be replaced.

For other models:

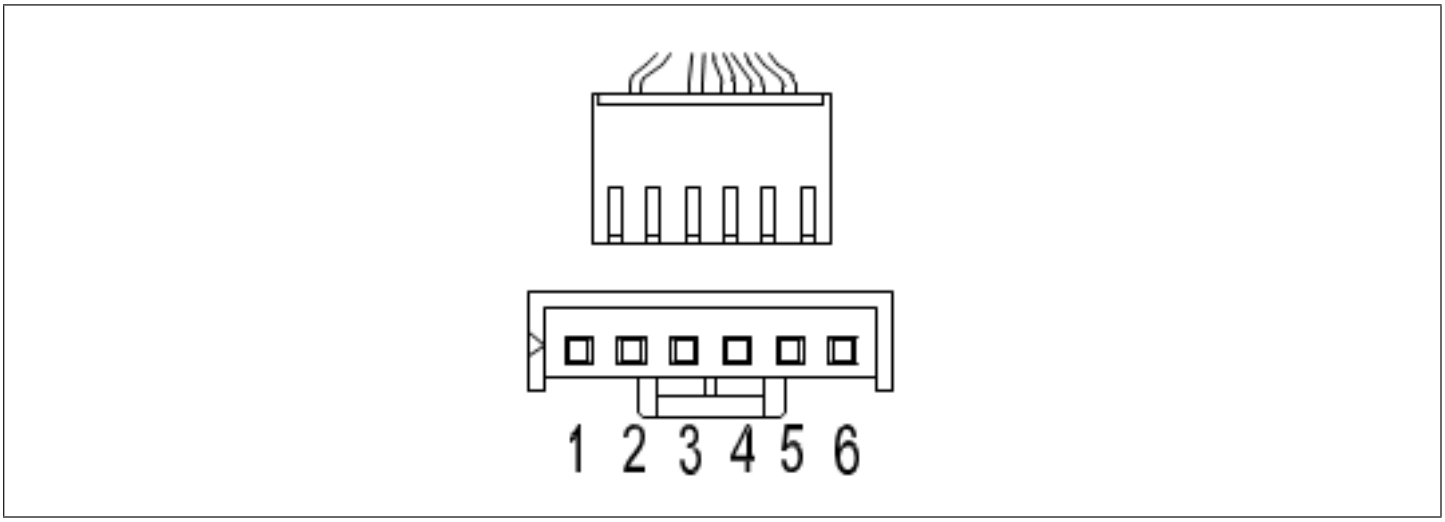


Figure 8. Pinouts

DC Motor Voltage Input and Output

Table 19. DC Motor Voltage Input and Output

NO.	Color	Signal	Voltage
1	Red	Vs/Vm	200V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	13.5-16.5V
5	Yellow	Vsp	0~6.5V
6	Blue	FG	13.5-16.5V

10.4. Four-Way Valve

NOTE: *For example Reversing Valve*

a. Power on, use a digital tester to measure the voltage, when the unit operates in cooling, it is 0V. When the unit operates in heating, it is about 230VAC. If the value of the voltage is not in the range, the outdoor unit main control board must have problems and will need to be replaced.

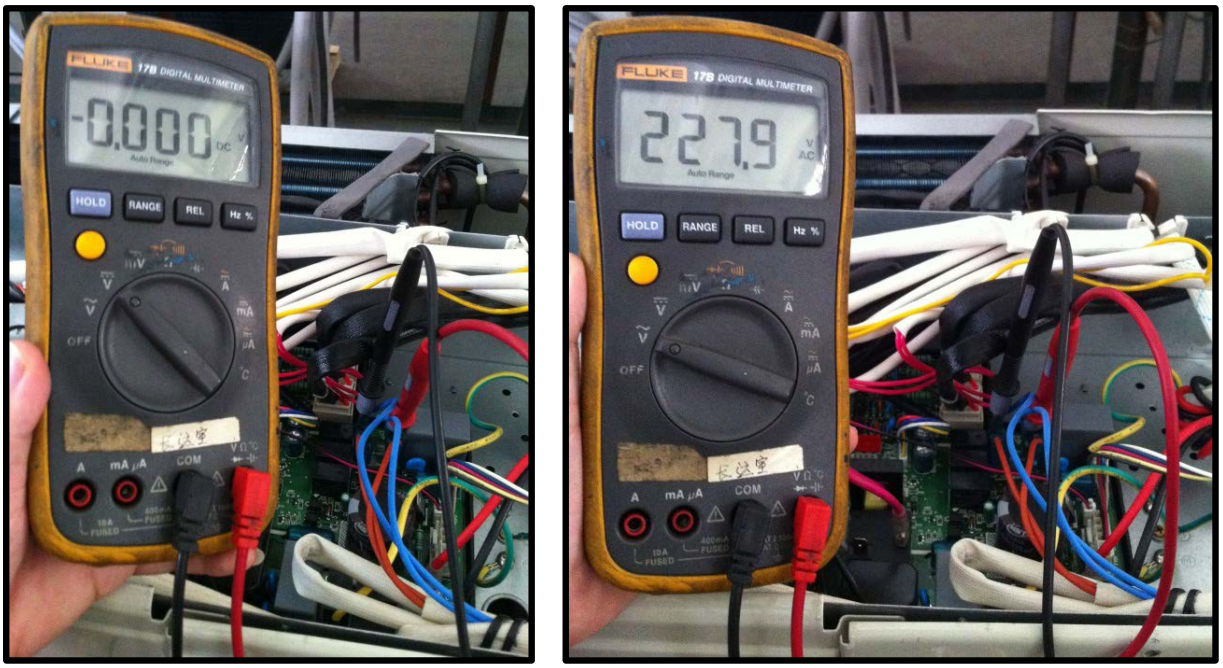


Figure 9. Measure Voltage

b. Turn off the power, use a digital tester to measure the resistance. The value should be 1.8~2.5 KΩ.

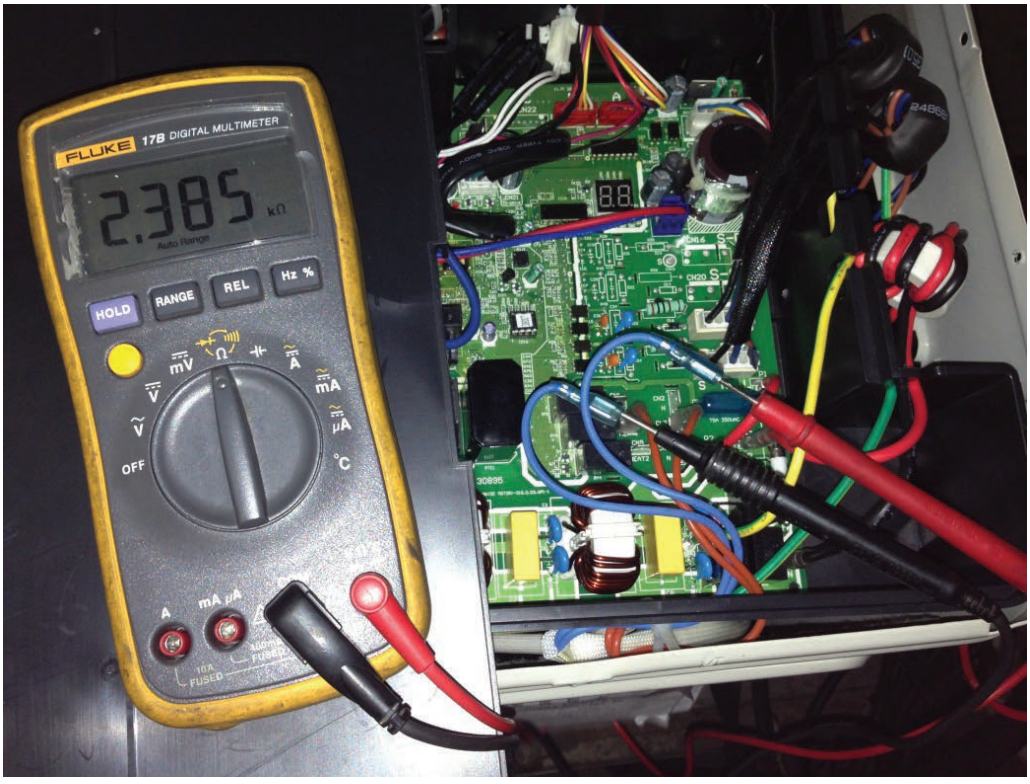


Figure 10. Measure Resistance

10.5. EXV Check

10.5.1. Original Production Models

Disconnect the connectors.

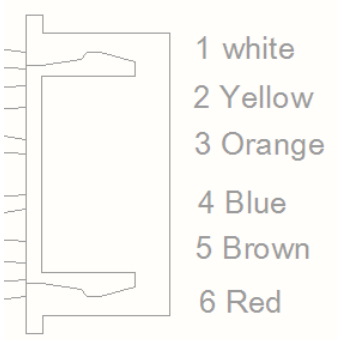


Figure 11. Connector Pin-Out

Table 20. Resistance

Color of lead wire	Normal Value
White	About 50Ω
Yellow	
Orange	
Blue	
Brown	Common
Red	

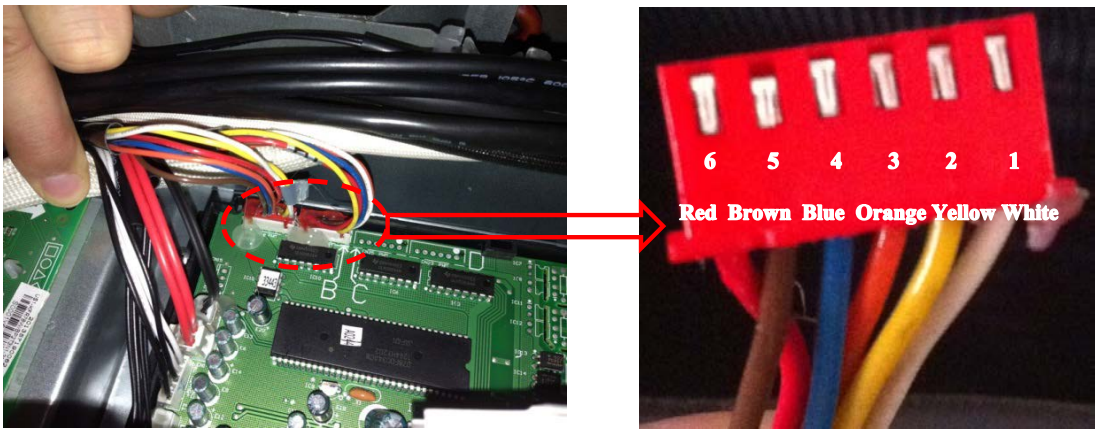


Figure 12. Connector Pin-Out

10.5.2. Later Production Models (Sanhua EEV)

Disconnect the connectors.

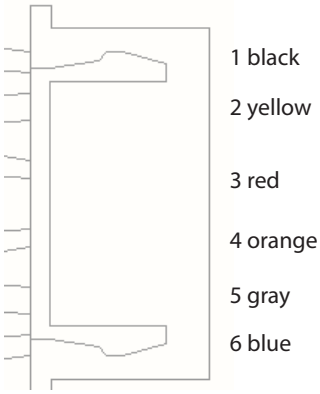


Figure 13. Connector Pin-Out

Table 21. Resistance

Color of lead wire	Normal Value
Black	About 50Ω
Yellow	
red	
Orange	
Gray	Common
Blue	

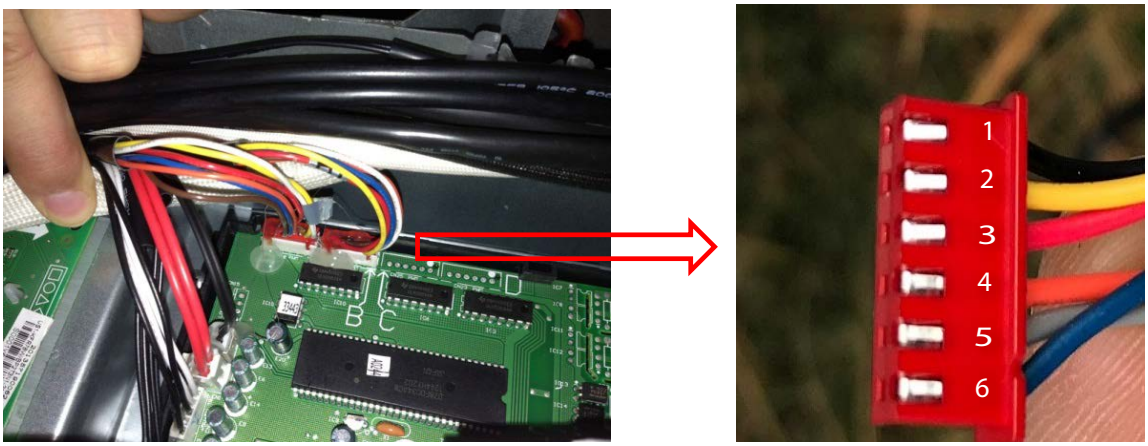


Figure 14. Connector Pin-Out

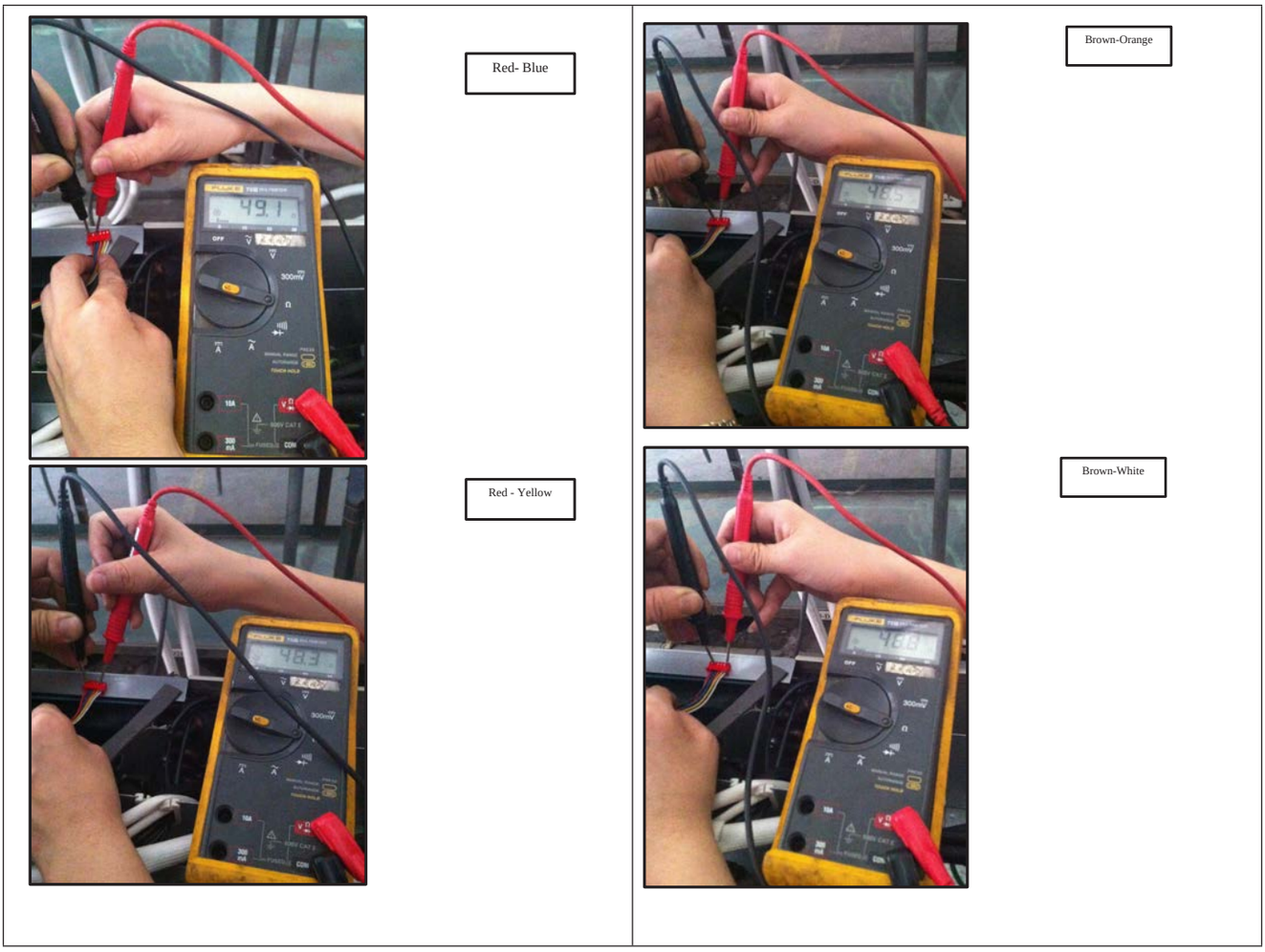


Figure 15. Connector Pin-Out

10.6. Electronic Expansion Valve (EXV) Control

a. EXV will be fully closed when turning on the power. Then EXV will be standby with 350P open and will open to target angle after compressor starts.

b. EXV will close with -160P when compressor stops. Then EXV will be standby with 350P open and will open to target angle after compressor starts.

c. The action priority of the EXVs is A-B-C-D.

d. Compressor and outdoor fan start operation only after EXV is initialized.

10.6.1. Cooling mode

The initial open angle of EXV is 250P, adjustment range is 100-350p. When the unit start to work for 3 minutes, the outdoor will receive indoor units(of capacity demand) T2B information and calculate the average of them. After comparing each indoor's T2B with the average, the outdoor gives the following modification commands: If the T2B>average, the relevant valve needs more 16p open; If the T2B= average, the relevant valve's open range remains; If the T2B<average, the relevant valve needs more 16p close.

This modification will be carried out every 2 minutes.

10.6.2. Heating mode

The initial open angle of EXV is 250P, adjustment range is 100-350p. When the unit start to work for 3 minutes, the outdoor will receive indoor units (of capacity demand) T2 information and calculate from subject received, size and categories.

After comparing each indoor's T2 with the average, the outdoor gives the following modification commands: If the T2>average+2, the relevant valve needs more 16p close;

If average+2≥the T2≥ average-2, the relevant valve's open range remains;

If the T2<average-2, the relevant valve needs more 16p open.

This modification will be carry out every 2 minutes.

11. Single Zone Error Codes

Table 22. Single Zone Error Codes

Unit Error Code Description	MLA, MPA & MPB Multi zone ODU unit	MPA009S4S-1L MPA012S4S-1L	MPA009S4S-1P, MPA012S4S-1P, MLA009S4S-1P, MLA012S4S-1P		MPB009S4S-1L, MPB012S4S-1L, MPB009S4S-1P, MPB012S4S-1P	MPA018S4S-1P, MPB018S4S-1P, MPB024S4S-1P, MLA018S4S-1P			MPA024S4S-1P MPA030S4S-1P MLA024S4S-1P MPB030S4S-1P 3PB036S4S-1P			MPA036S4S-1P MPB036S4S-1P		MPA048S4S-1P MPB048S4S-1P	MWMA & MWMB Series IDU unit 3WMB036S4-1P			MMDA, MMDB, MCFA, MCFB, M22A, M33A & M33B Series IDU unit			Programmable Wired Controller
Part number	16022300A04748	16022000A36189	16022000A36193		16022000B12368	16022000A36442			16022000A35694			16022000B12369		16022000B12371	16022000A36038			16023000A09937			N/A
		Main Control Board	Main Control Board		Main Control Board	Main Control Board	IPM Board		Main Control Board	IPM Board		IPM Board									
LED		LED 1: Blue	Yellow LED2	Red LED1	LED 1: Red	Yellow LED1	Red LED2	Green LED3	Blue LED1	Red LED2	Green LED1	Red LED4	Green LED3		# of short Flash of running light	State of Timer light	Display on IDU	# of short Flash of running light	State of Timer light	Display on IDU	Display on controller
Communication error between wired controller and indoor unit	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	F0
The cassette faceplate is abnormal	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	F1
Indoor unit EEPROM error	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1 time	Off	E0	1 time	Off	E0	E7
Communication error between indoor unit and outdoor units	E2	n/a	n/a	n/a	n/a	Flash Flash	Off	LIT	Flash Flash	Off	LIT	Off	LIT	E1	2 times	Off	E1	2 times	Off	E1	E1
Indoor fan speed error	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	4 times	Off	E3	4 times	Off	E3	E8
Indoor Return air temperature sensor error	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	5 times	Off	E4	5 times	Off	E4	E2
Indoor coil temperature sensor error	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6 times	Off	E5	6 times	Off	E5	E3
Low refrigerant	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 times	Off	EC	7 times	Off	EC	EF
High water level alarm	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	N/A	N/A	N/A	8 times	Off	EE	EE
Outdoor current overload sensed	P3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	F0	1 time	LIT	F0	1 time	LIT	F0	EA
Outdoor ambient temperature sensor error	E4	n/a	n/a	n/a	n/a	Flash Flash	Off	LIT	Flash Flash	Off	LIT	Off	LIT	F1	2 times	LIT	F1	2 times	LIT	F1	E5
Outdoor coil temperature sensor error	E4	n/a	n/a	n/a	n/a	Flash Flash	Off	LIT	Flash Flash	Off	LIT	Off	LIT	F2	3 times	LIT	F2	3 times	LIT	F2	E5
Compressor discharge temperature sensor error	E4	n/a	n/a	n/a	n/a	Flash Flash	Off	LIT	Flash Flash	Off	LIT	Off	LIT	F3	4 times	LIT	F3	4 times	LIT	F3	E5
Outdoor unit EEPROM error	E0	n/a	n/a	n/a	n/a	Flash Flash	Off	LIT	Flash Flash	Off	LIT	Off	LIT	F4	5 times	LIT	F4	5 times	LIT	F4	Ed
Outdoor unit fan speed error	E8	n/a	n/a	n/a	n/a	Flash Flash	Off	LIT	Flash Flash	Off	LIT	Off	LIT	F5	6 times	LIT	F5	6 times	LIT	F5	Ed
Indoor coil outlet temperature sensor error	E4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7 times	LIT	F6	7 times	LIT	F6	E4

Note:

n/a: Don't display

Slow Flash----Flashing at 1Hz

Flash Flash----Flashing at 2Hz

Table 22. Single Zone Error Codes

Unit Error Code Description	MLA, MPA & MPB Multi zone ODU unit	MPA009S4S-1L MPA012S4S-1L	MPA009S4S-1P, MPA012S4S-1P, MLA009S4S-1P, MLA012S4S-1P		MPB009S4S-1L, MPB012S4S-1L, MPB009S4S-1P, MPB012S4S-1P	MPA018S4S-1P, MPB018S4S-1P, MPB024S4S-1P, MLA018S4S-1P			MPA024S4S-1P MPA030S4S-1P MLA024S4S-1P MPB030S4S-1P 3PB036S4S-1P			MPA036S4S-1P MPB036S4S-1P		MPA048S4S-1P MPB048S4S-1P	MWMA & MWMB Series IDU unit 3WMB036S4-1P			MMDA, MMDB, MCFA, MCFB, M22A, M33A & M33B Series IDU unit			Programmable Wired Controller
Part number	16022300A04748	16022000A36189	16022000A36193		16022000B12368	16022000A36442			16022000A35694			16022000B12369		16022000B12371	16022000A36038			16023000A09937			N/A
		Main Control Board	Main Control Board		Main Control Board	Main Control Board	IPM Board		Main Control Board	IPM Board		IPM Board									
LED		LED 1: Blue	Yellow LED2	Red LED1	LED 1: Red	Yellow LED1	Red LED2	Green LED3	Blue LED1	Red LED2	Green LED1	Red LED4	Green LED3		# of short Flash of running light	State of Timer light	Display on IDU	# of short Flash of running light	State of Timer light	Display on IDU	Display on controller
Inverter module IPM error	P6	n/a	n/a	n/a	n/a	Flash Flash	Off	Flash Flash	Flash Flash	Off	Flash Flash	Off	Flash Flash	P0	1 time	Flash	P0	1 time	Flash	P0	Eb
High or Low voltage protection	E5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	P1	2 times	Flash	P1	2 times	Flash	P1	N/A
Outdoor unit low temperature lockout	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	P3	4 times	Flash	P3	4 times	Flash	P3	N/A
Communication malfunction between Cassette and panel		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	8 times	Lit	F7	n/a
Compressor drive error	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	P4	5 times	Flash	P4	5 times	Flash	P4	N/A
Mode conflict	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6 times	Flash	P5	6 times	Flash	--	N/A
High pressure switch open	P1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	J5	n/a	n/a	n/a	7 times	Flash	P6	N/A
Low pressure switch open	P2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	J6	n/a	n/a	n/a	7 times	Flash	P6	N/A
Outdoor IGBT temperature sensor error	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	EF
Communication error between outdoor unit main control and IPM control	E3	n/a	n/a	n/a	n/a	Flash Flash	Flash Flash	Flash Flash	Flash Flash	Flash Flash	Flash Flash	Flash Flash	Flash Flash	J4	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Indoor unit #1 coil outlet temperature sensor error	F1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Indoor unit #2 coil outlet temperature sensor error	F2	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Indoor unit #3 coil outlet temperature sensor error	F3	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Indoor unit #4 coil outlet temperature sensor error	F4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Indoor unit #5 coil outlet temperature sensor error	F5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Indoor unit #6 coil outlet temperature sensor error	F6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note:

n/a: Don't display

Slow Flash----Flashing at 1Hz

Flash Flash----Flashing at 2Hz

Table 22. Single Zone Error Codes

Unit Error Code Description	MLA, MPA & MPB Multi zone ODU unit	MPA009S4S-1L MPA012S4S-1L	MPA009S4S-1P, MPA012S4S-1P, MLA009S4S-1P, MLA012S4S-1P		MPB009S4S-1L, MPB012S4S-1L, MPB009S4S-1P, MPB012S4S-1P	MPA018S4S-1P, MPB018S4S-1P, MPB024S4S-1P, MLA018S4S-1P			MPA024S4S-1P MPA030S4S-1P MLA024S4S-1P MPB030S4S-1P 3PB036S4S-1P			MPA036S4S-1P MPB036S4S-1P		MPA048S4S-1P MPB048S4S-1P	MWMA & MWMB Series IDU unit 3WMB036S4-1P			MMDA, MMDB, MCFA, MCFB, M22A, M33A & M33B Series IDU unit			Programmable Wired Controller
Part number	16022300A04748	16022000A36189	16022000A36193		16022000B12368	16022000A36442			16022000A35694			16022000B12369		16022000B12371	16022000A36038			16023000A09937			N/A
		Main Control Board	Main Control Board		Main Control Board	Main Control Board	IPM Board		Main Control Board	IPM Board		IPM Board									
LED		LED 1: Blue	Yellow LED2	Red LED1	LED 1: Red	Yellow LED1	Red LED2	Green LED3	Blue LED1	Red LED2	Green LED1	Red LED4	Green LED3		# of short Flash of running light	State of Timer light	Display on IDU	# of short Flash of running light	State of Timer light	Display on IDU	Display on controller
High temperature sensed at compressor top	P0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	P2	n/a	n/a	n/a	3 times	Flash	P2	n/a
High temperature sensed at compressor discharge line	P4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	J2	n/a	n/a	n/a	n/a	n/a	n/a	n/a
High temperature sensed at outdoor coil	P5	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	J1	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Standby	n/a	SLOW Flash	LIT	SLOW Flash	SLOW Flash	SLOW Flash	Off	LIT	SLOW Flash	Off	LIT	Off	LIT	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Normal operation	n/a	LIT	LIT	LIT	LIT	LIT	LIT	Off	LIT	LIT	Off	LIT	Off	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Outdoor unit error	n/a	Flash Flash	LIT	Flash Flash	Flash Flash	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
DC bus voltage too high/ too low protection	n/a	n/a	n/a	n/a	n/a	Flash Flash	LIT	LIT	Flash Flash	LIT	LIT	LIT	LIT	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Driver EEPROM error	n/a	n/a	n/a	n/a	n/a	Flash Flash	Flash Flash	LIT	Flash Flash	Flash Flash	LIT	Flash Flash	LIT	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Driver phase loss protection, or driver zero speed protection, or PWM synchronization failure	n/a	n/a	n/a	n/a	n/a	Flash Flash	Flash Flash	Off	Flash Flash	Flash Flash	Off	Flash Flash	Off	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Driver phase loss protection,or driver zero speed protection, or PWM synchronization failure	n/a	n/a	n/a	n/a	n/a	Flash Flash	LIT	Flash Flash	Flash Flash	LIT	Flash Flash	LIT	Flash Flash	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
IGBT over-current/IPM over-current	n/a	n/a	n/a	n/a	n/a	Flash Flash	Off	Flash Flash	Flash Flash	Off	Flash Flash	Off	Flash Flash	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
High temperature protection of indoor coil in heating	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	J0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
PFC module protection	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	J3	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note:

n/a: Don't display

Slow Flash----Flashing at 1Hz

Flash Flash----Flashing at 2Hz

Table 22. Single Zone Error Codes

Unit Error Code Description	MLA, MPA & MPB Multi zone ODU unit	MPA009S4S-1L MPA012S4S-1L	MPA009S4S-1P, MPA012S4S-1P, MLA009S4S-1P, MLA012S4S-1P		MPB009S4S-1L, MPB012S4S-1L, MPB009S4S-1P, MPB012S4S-1P	MPA018S4S-1P, MPB018S4S-1P, MPB024S4S-1P, MLA018S4S-1P			MPA024S4S-1P MPA030S4S-1P MLA024S4S-1P MPB030S4S-1P 3PB036S4S-1P			MPA036S4S-1P MPB036S4S-1P		MPA048S4S-1P MPB048S4S-1P	MWMA & MWMB Series IDU unit 3WMB036S4-1P			MMDA, MMDB, MCFA, MCFB, M22A, M33A & M33B Series IDU unit			Programmable Wired Controller
Part number	16022300A04748	16022000A36189	16022000A36193		16022000B12368	16022000A36442			16022000A35694			16022000B12369		16022000B12371	16022000A36038			16023000A09937			N/A
		Main Control Board	Main Control Board		Main Control Board	Main Control Board	IPM Board		Main Control Board	IPM Board		IPM Board									
LED		LED 1: Blue	Yellow LED2	Red LED1	LED 1: Red	Yellow LED1	Red LED2	Green LED3	Blue LED1	Red LED2	Green LED1	Red LED4	Green LED3		# of short Flash of running light	State of Timer light	Display on IDU	# of short Flash of running light	State of Timer light	Display on IDU	Display on controller
Outdoor IPM module temperature sensor malfunction	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	P7	n/a	n/a	n/a	n/a	n/a	n/a	n/a
AC voltage protection	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	J8	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Low Ambient temperature protection			LP	n/a	n/a	LP	n/a	n/a	LP	n/a	n/a	n/a	LP	LP	4 times	Flashes	P2	4 times	Flashes	P2	n/a

Note:

n/a: Don't display

Slow Flash----Flashing at 1Hz

Flash Flash----Flashing at 2Hz

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