

MAINTENANCE

UNITS MAINTENANCE

1 ERROR CODE LIST

➤ Complete Unit Code

Code Indication	Error Name	Source of Error Signal	Control Description
F4	Outdoor environment temp sensor error	<ul style="list-style-type: none"> The plug on temperature sensor is not correctly connected to the socket on mainboard. The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
F6	Defrost temp sensor error	<ul style="list-style-type: none"> The plug on temperature sensor is not correctly connected to the socket on mainboard. The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
F7	Discharge temp sensor error	<ul style="list-style-type: none"> The plug on temperature sensor is not correctly connected to the socket on mainboard. The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
F5	Suction temp sensor error	<ul style="list-style-type: none"> The plug on temperature sensor is not correctly connected to the socket on mainboard. The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
EF	Outdoor fan error	<ul style="list-style-type: none"> Mainboard of outdoor unit is damaged. The wire connecting the wiring terminals of the mainboard breaks. 	If it occurs for 6 times during one hour, it is cleared by de-energization. If it occurs for less than 6 times, it will be automatically cleared.
E5	Overload protection of compressor or driver error	<ul style="list-style-type: none"> It is the compressor overload switch error or the compressor drive protection, and please see the indicating lamp on the main board of the outdoor unit or the 88 nixie tube for the protection code. 	Drive failure; it will be automatically cleared after 1 min.

E1	Comp High-pressure protection	<ul style="list-style-type: none"> ● Comp High-pressure switch is broken or the wiring is loose. ● The water in the tank is not enough. ● The installation of tank temperature sensor is not correct. ● The gas valve and liquid valve are not fully open. ● The electric expansion valve can not work normally. 	De-energize the unit and then, energize it again. If the malfunction is removed, the code will be cleared.
E3	Comp Low- pressure protection	<ul style="list-style-type: none"> ● Comp Low-pressure switch is broken or the wiring is loose. ● The system has leaked. ● The fans stop running or reverse. 	It will be cleared if the malfunction is removed after the unit has been turned off.
E4	Comp Discharge temp protection	<ul style="list-style-type: none"> ● The resistance of temperature sensor is not correct. ● The electric expansion valve is blocked. ● The system has leaked. ● Mainboard of outdoor unit is damaged. 	It will be cleared if the discharge temp is lower than 92 ℃.
C5	Indoor capacity switch error		De-energize the unit and then, energize it again. If the malfunction is removed, the code will be cleared.
E6	Communication malfunction (between outdoor and indoor mainboard)	<ul style="list-style-type: none"> ● The communication line of the unit is not connected. ● The communication line is not through. ● The communication line of the unit is not connected correctly. ● The two ends of communication line are not mounted with magnetic ring. ● The outdoor unit is not electrically powered 	It will be cleared once communication recovers or it will be shown all the time
E6	Communication malfunction (between outdoor mainboard and wired controller)	<ul style="list-style-type: none"> ● The communication line of the unit is not connected. ● The communication line is not through. ● The communication line of the unit is not connected correctly. ● The two ends of 	It will be cleared once communication recovers or it will be shown all the time

		<p>communication line are not mounted with magnetic ring.</p> <ul style="list-style-type: none"> ● The outdoor unit is not electrically powered 	
Fc	High pressure sensor error	<ul style="list-style-type: none"> ● The sensor is damaged. ● The wire of the sensor is loose. ● The position of the sensor is wrong 	It will be automatically cleared after the failure is removed.
F9	Outlet temperature sensor error	<ul style="list-style-type: none"> ● The plug on temperature sensor is not correctly connected to the socket on mainboard. ● The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
dH	Backup outlet temperature sensor error	<ul style="list-style-type: none"> ● The plug on temperature sensor is not correctly connected to the socket on mainboard. ● The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
F1	Liquid pipe temperature sensor Inside refrigerant error	<ul style="list-style-type: none"> ● The plug on temperature sensor is not correctly connected to the socket on mainboard. ● The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
F8	Inlet temperature sensor error	<ul style="list-style-type: none"> ● The plug on temperature sensor is not correctly connected to the socket on mainboard. ● The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
FE	The second sanitary water tank temperature sensor error	<ul style="list-style-type: none"> ● The plug on temperature sensor is not correctly connected to the socket on mainboard. ● The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
FL	The first sanitary water tank temperature sensor error	<ul style="list-style-type: none"> ● The plug on temperature sensor is not correctly connected to the socket on mainboard. ● The resistance of temperature 	It will be automatically cleared after the failure is removed.

		sensor is not correct.	
F3	Gas pipe temperature sensor inside refrigerant error	<ul style="list-style-type: none"> The plug on temperature sensor is not correctly connected to the socket on mainboard. The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
dF	other thermal outlet temperature sensor error	<ul style="list-style-type: none"> The plug on temperature sensor is not correctly connected to the socket on mainboard. The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
F0	Remote room temperature sensor error	<ul style="list-style-type: none"> The plug on temperature sensor is not correctly connected to the socket on mainboard. The resistance of temperature sensor is not correct. 	It will be automatically cleared after the failure is removed.
Ec	Water switch error	<ul style="list-style-type: none"> The switch is damaged. The wire of the switch is loose. The position of the switch is wrong 	It will be cleared after the unit is turned off.
E2	Indoor anti-frozen protection	<ul style="list-style-type: none"> The resistance of temperature sensor is not correct. The electric expansion valve can not work normally. 	It will be cleared once malfunction is removed or it will be shown all the time; but it will be cleared immediately when switching operation mode.
No display	Sanitary water tank High-temp protection	<ul style="list-style-type: none"> The resistance of temperature sensor is not correct. The plug on temperature sensor is not correctly connected to the socket on mainboard. Mainboard of outdoor unit is damaged. 	Press ON/OFF key to clear
Ed	outlet temperature High-temp protection (This error code will not displayed on wired controller but only on mainboard of outdoor unit)	<ul style="list-style-type: none"> The resistance of temperature sensor is not correct. The plug on temperature sensor is not correctly connected to the socket on mainboard. 	De-energize the unit and then, energize it again. If the malfunction is removed, the code will be cleared.

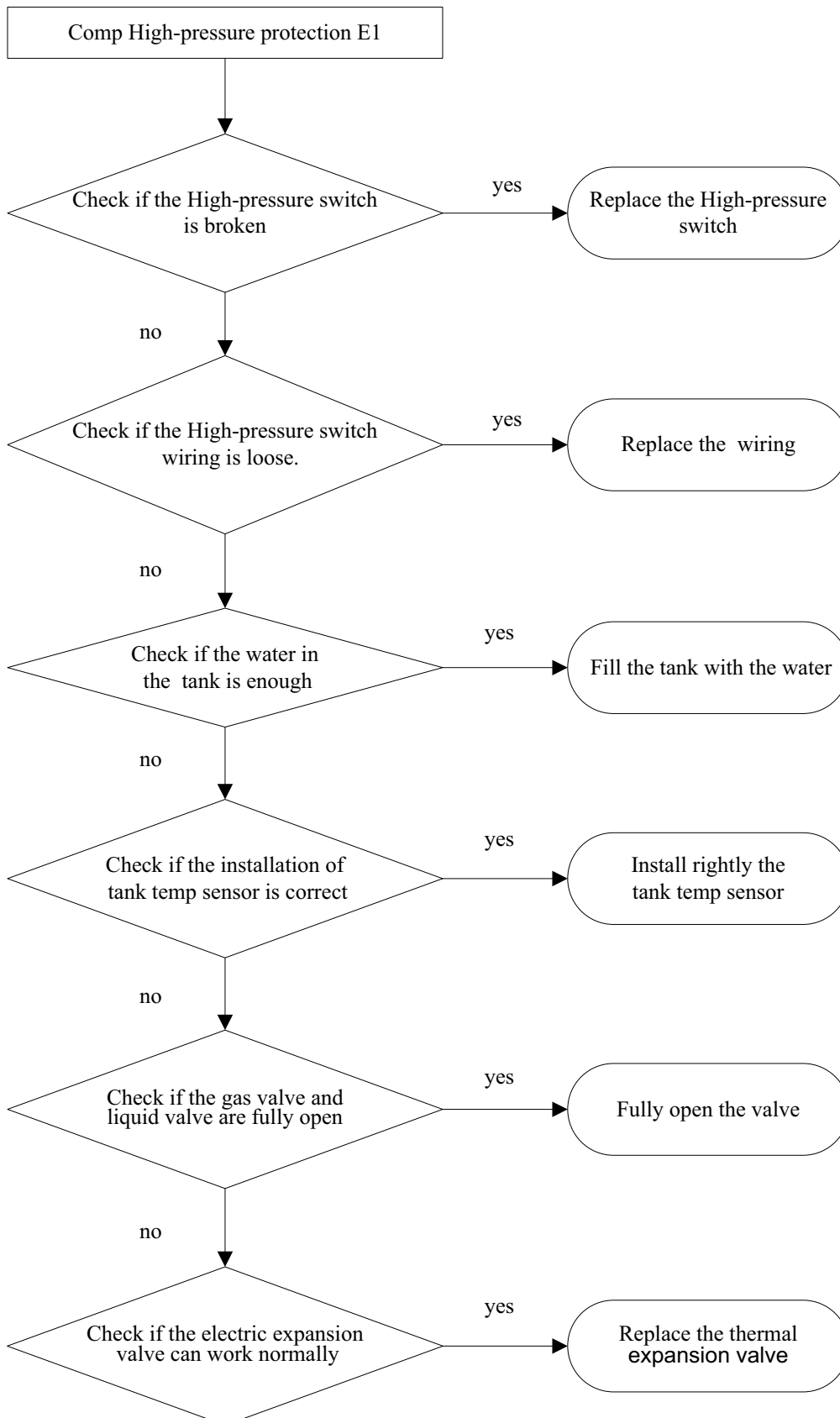
		<ul style="list-style-type: none"> ● Mainboard of outdoor unit is damaged. 	
No display	solar outlet High-temp protection	<ul style="list-style-type: none"> ● The resistance of temperature sensor is not correct. ● The plug on temperature sensor is not correctly connected to the socket on mainboard. ● Mainboard of outdoor unit is damaged. 	Press ON/OFF key to clear
EH	the first internal electric heater connection Malfunction	<ul style="list-style-type: none"> ● The AC contactor is damaged. 	De-energize the unit and then, energize it again. If the malfunction is removed, the code will be cleared.
EH	second internal electric heater connection Malfunction	<ul style="list-style-type: none"> ● The AC contactor is damaged. 	De-energize the unit and then, energize it again. If the malfunction is removed, the code will be cleared.
EH	sanitary water tank electric heater connection Malfunction	<ul style="list-style-type: none"> ● The AC contactor is damaged. 	De-energize the unit and then, energize it again. If the malfunction is removed, the code will be cleared.
dU	Pull-out of the gate-controller	<ul style="list-style-type: none"> ● the gate-controller is pull out 	It will be cleared after the gate-controller is rewired

➤ Drive Failure Code

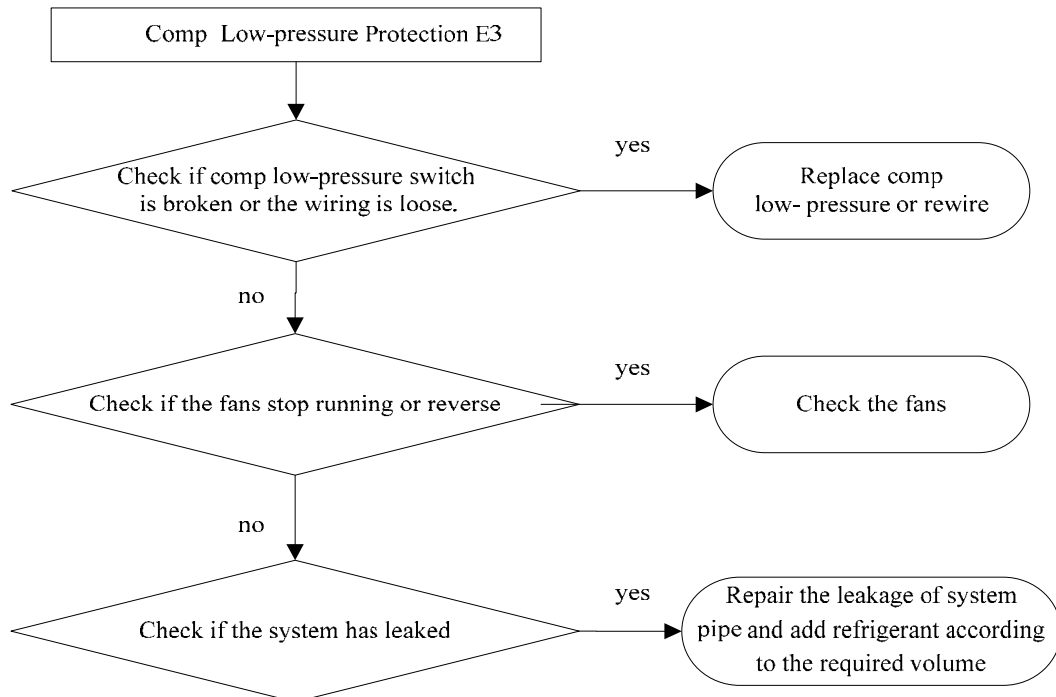
Item		Display on Nixie Tube of Outdoor Unit	Display on Wired Controller	Remarks
Inverter Drive Failure	Reset of Drive System	P0	E5	
	Startup Failure of Compressor	Lc	E5	
	Phase Protection	Ld	E5	
	Lock	LE	E5	
	Overspeed	LF	E5	
	Current protection of compressor	P5	E5	
	Communication failure	P6	E5	
	Sensor failure of heat sink	P7	E5	
	Overheat protection of heat sink	P8	E5	
	AC contactor protection	P9	E5	
	AC current protection (input side)	PA	E5	
	Current sensor failure	Pc	E5	
	Connection protection of sensor	Pd	E5	
	Temperature drift protection	PE	E5	
	Ambient sensor failure of drive plate	PF	E5	
	Overvoltage protection	PH	E5	
	Under-voltage protection	PL	E5	
	Abnormality of input AC voltage	PP	E5	
	Charge circuit failure	PU	E5	
	IPM protection	H5	E5	
Desynchronizing of motor	H7	E5		
PFC abnormality	Hc	E5		

2 FLOW CHART OF TROUBLESHOOTING

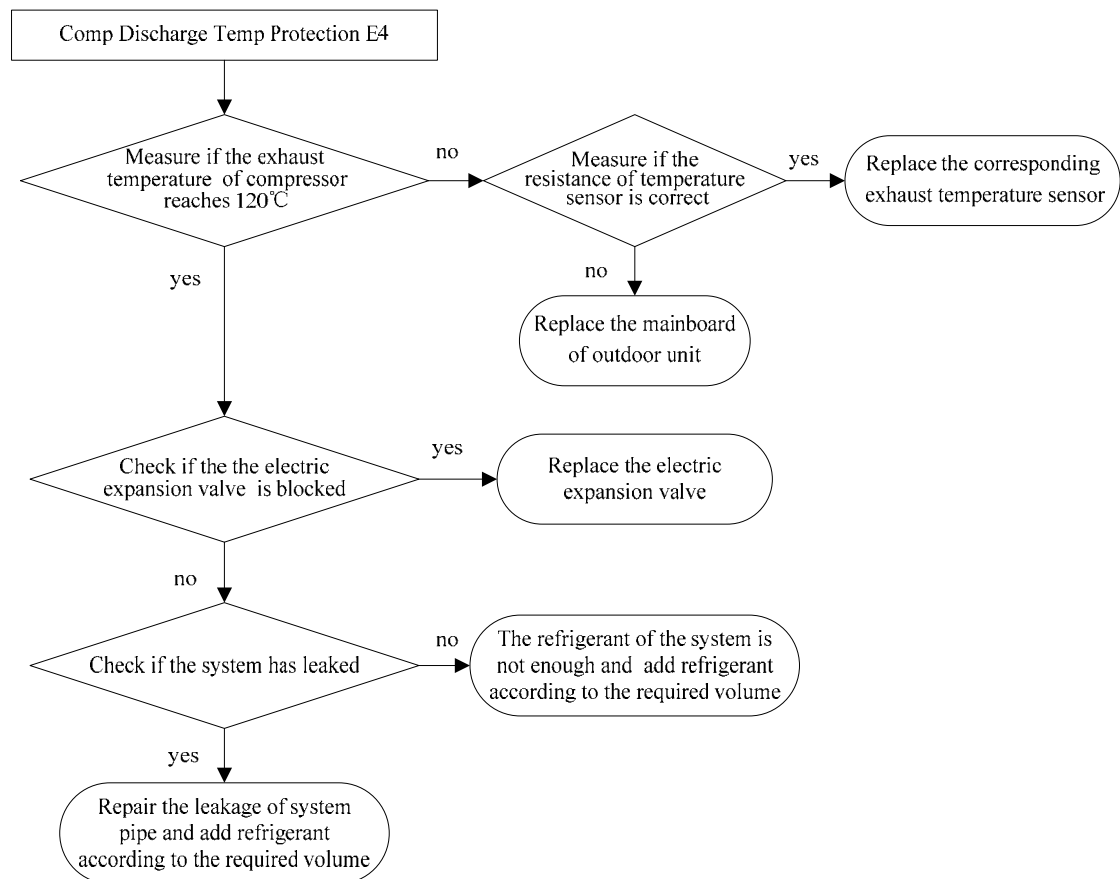
(1) Comp High-pressure Protection E1



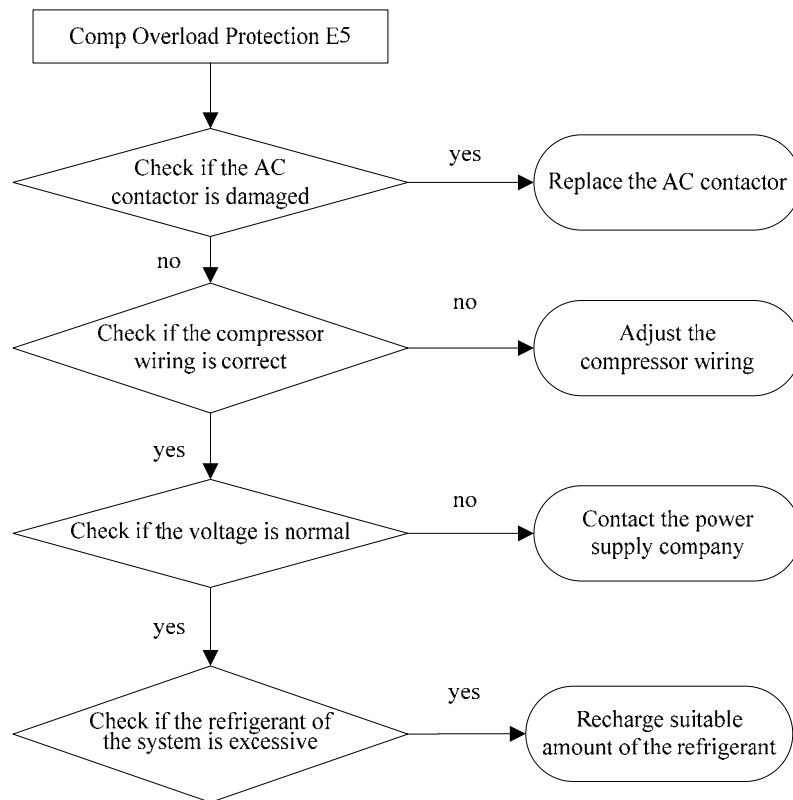
(2) Comp Low- pressure Protection E3



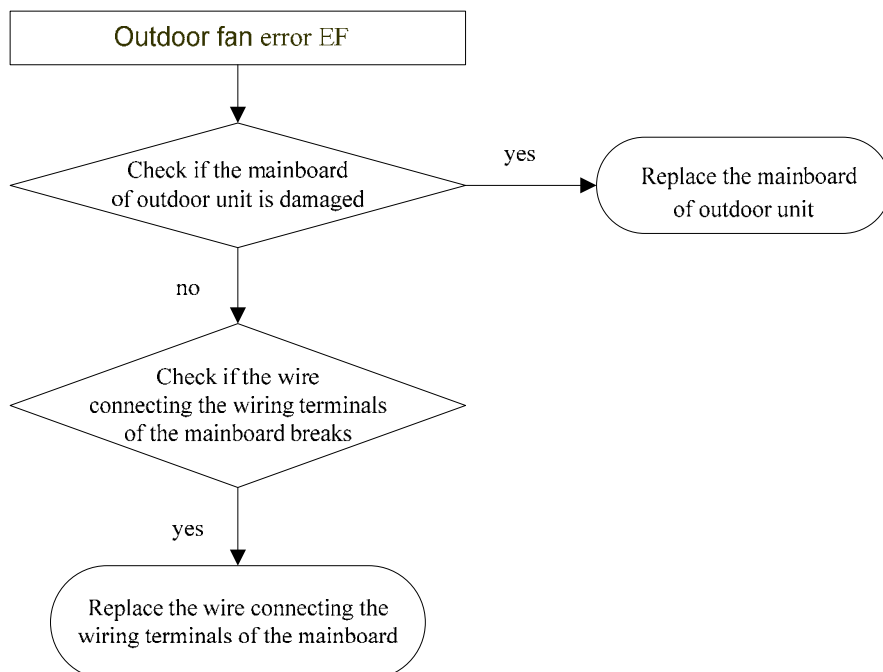
(3) Comp Discharge Temp Protection E4



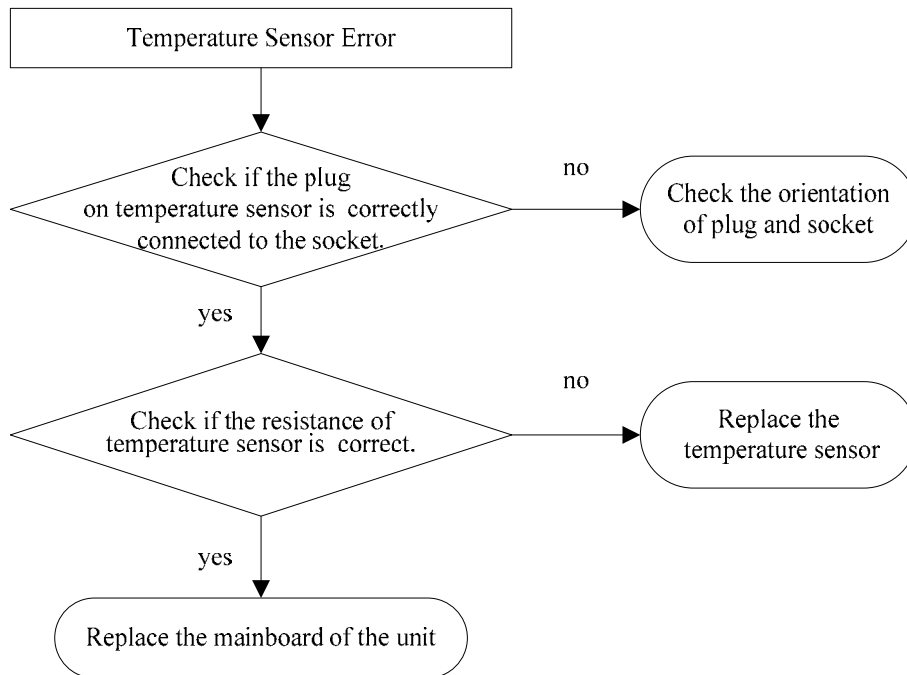
(4) Overload protection of compressor or driver error E5



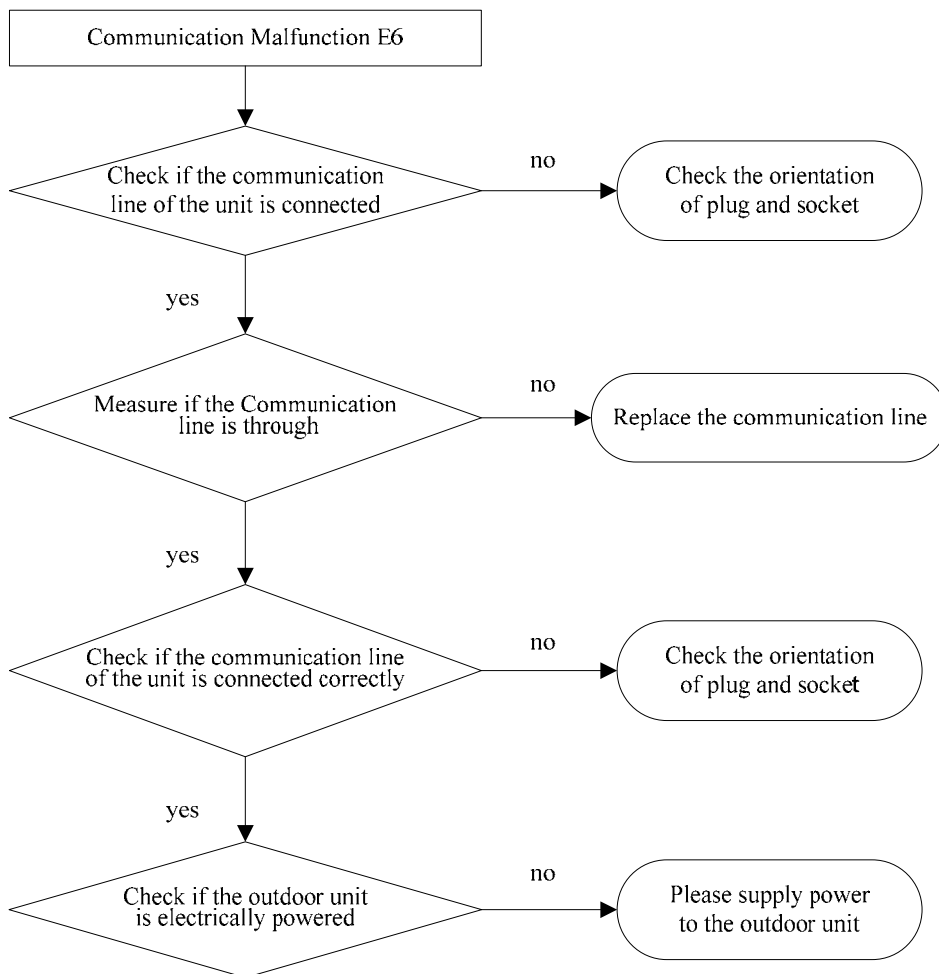
(5) Outdoor fan error EF



(6) Temperature sensor error



(7) Communication Malfunction E6



3 DIAGNOSIS OF DRIVING

(1) Overvoltage of direct current bus: It is detected that the voltage of direct current bus is over 420V after energization. If the protection occurs for 6 times within one hour, it can not be resumed unless it is deenergized and reenergized.

(2) Under-voltage of direct current bus: It is detected that the voltage of direct current bus is lower than 200V after startup of the unit. . If the protection occurs for 6 times within one hour, it can not be resumed unless it is deenergized and reenergized.

(3) PFC abnormality: The protection against PFC abnormality is detected after the PFC works for 10s. If the protection occurs for 6 times within one hour, it can not be resumed unless it is deenergized and reenergized.

(4) IPM protection of driving: The protection against IPM abnormality is detected after the IPM works for 10s. If the protection occurs for 6 times within one hour, it can not be resumed unless it is deenergized and reenergized.

(5) Overcurrent protection of compressor: The protection occurs when the instantaneous current is detected over 45A. If the protection occurs for 6 times within one hour, it can not be resumed unless it is deenergized and reenergized.

(6) Superheat protection of IPM driving: The protection occurs when the internal temperature of IPM is detected higher than 105 degree. If the protection occurs for 6 times within one hour, it can not be resumed unless it is deenergized and reenergized.

(7) Abnormal sensor of radiating fin: The protection occurs when break circuit or short circuit of the temperature sensor on top of the IPM module. If the protection occurs for 6 times within one hour, it can not be resumed unless it is deenergized and reenergized.

(8) Communication error of conversion driver and main controller: the driving can not communicate with the main controller normally. This error can be resumed automatically.

3.1 Diagnosis Flowchart of Driving of Single-phase Unit

3.1.1 PFC Abnormality

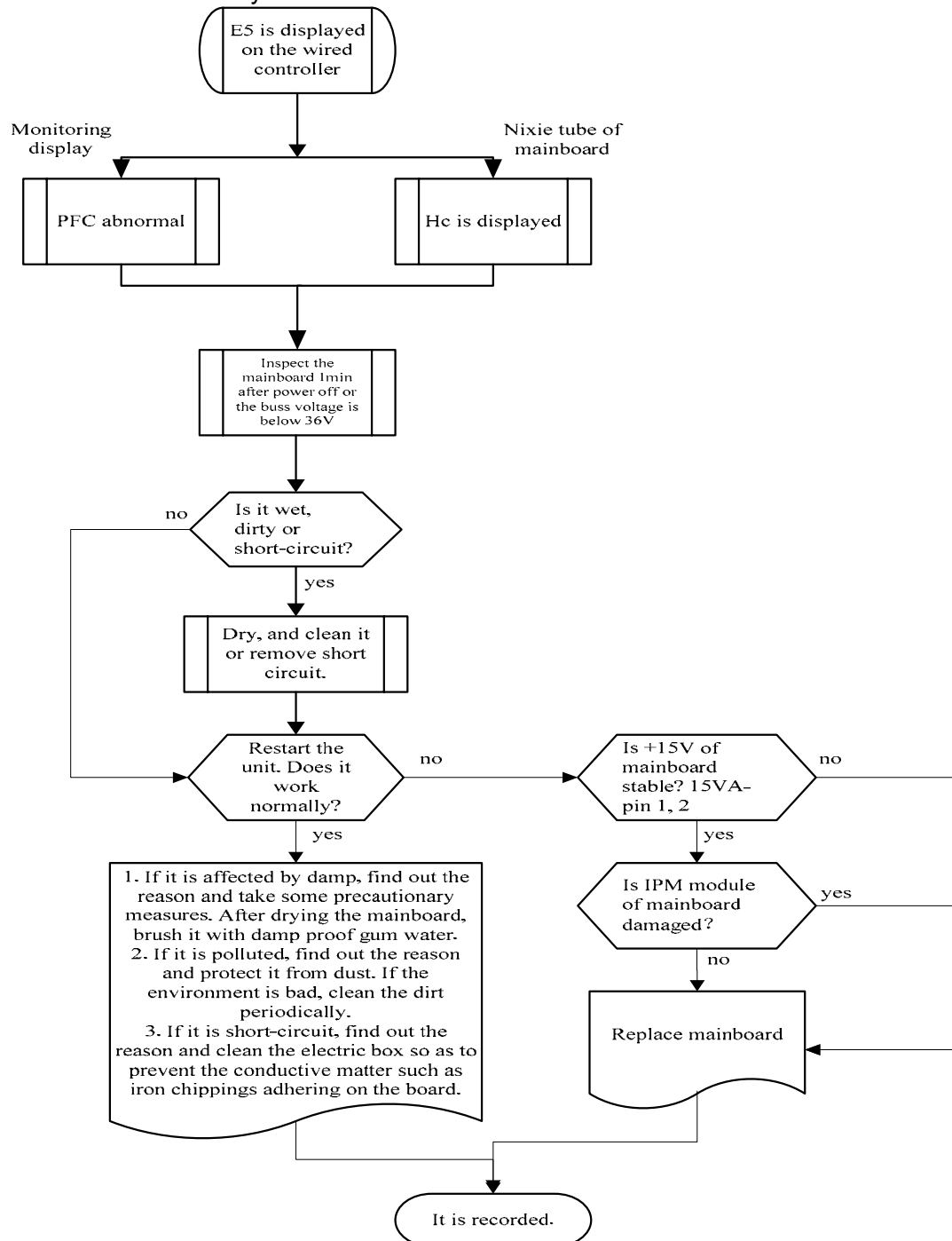


Fig. 3.1.1 Flowchart of diagnosis of PFC abnormality

3.1.2 IPM Protection

The reasons may be:

- Untight screws of IPM module
- damaged IPM module
- defective radiating of IPM module
- abnormal +15V power strip
- abnormal PFC module

- wire connection error with PFC
- wrong cement resistance RS1-RS3 of driving
- abnormal compressor
- interference

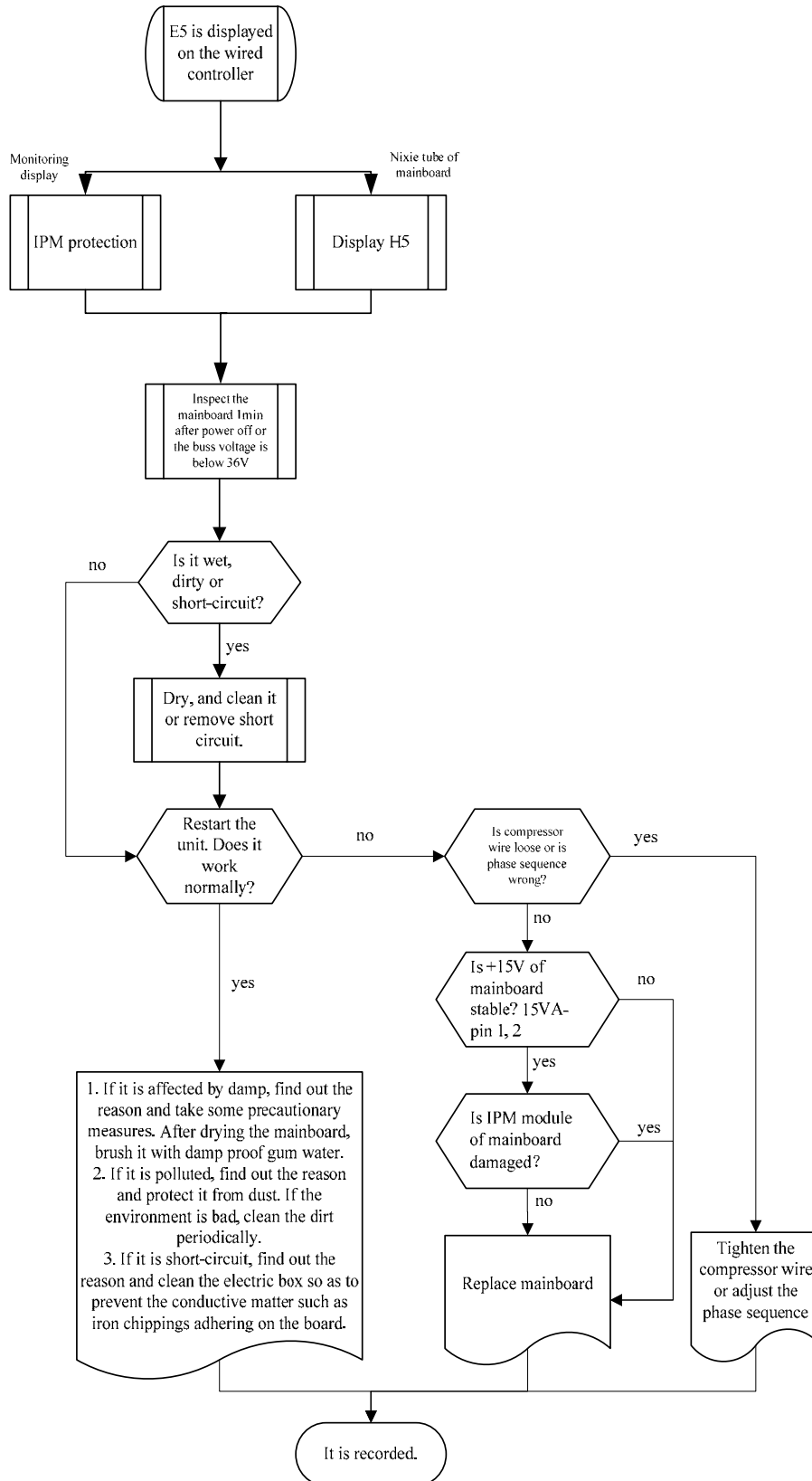


Fig. 3.1.2 Flowchart of diagnosis of IPM protection

3.1. 3 Trip

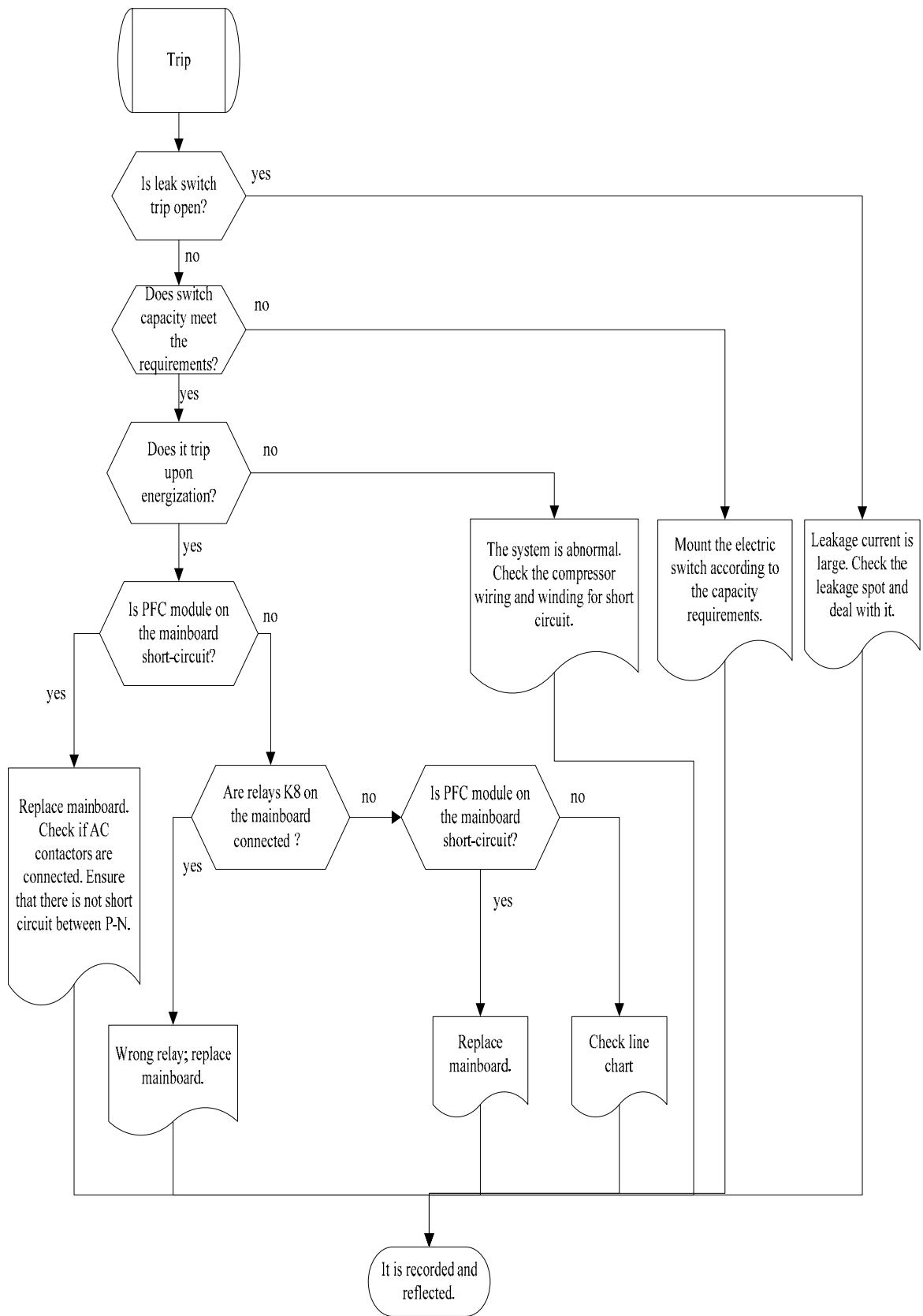


Fig. 3.1.3 Flowchart of trip diagnosis

3.1.4 Abnormal Noise of PFC Inductor

Generally, the continuous and minute sound of inductor is normal. Abnormal noise of PFC inductor refers to discontinuous and obvious noise. The reasons may be:

- PFC malfunction
- abnormal output of driving

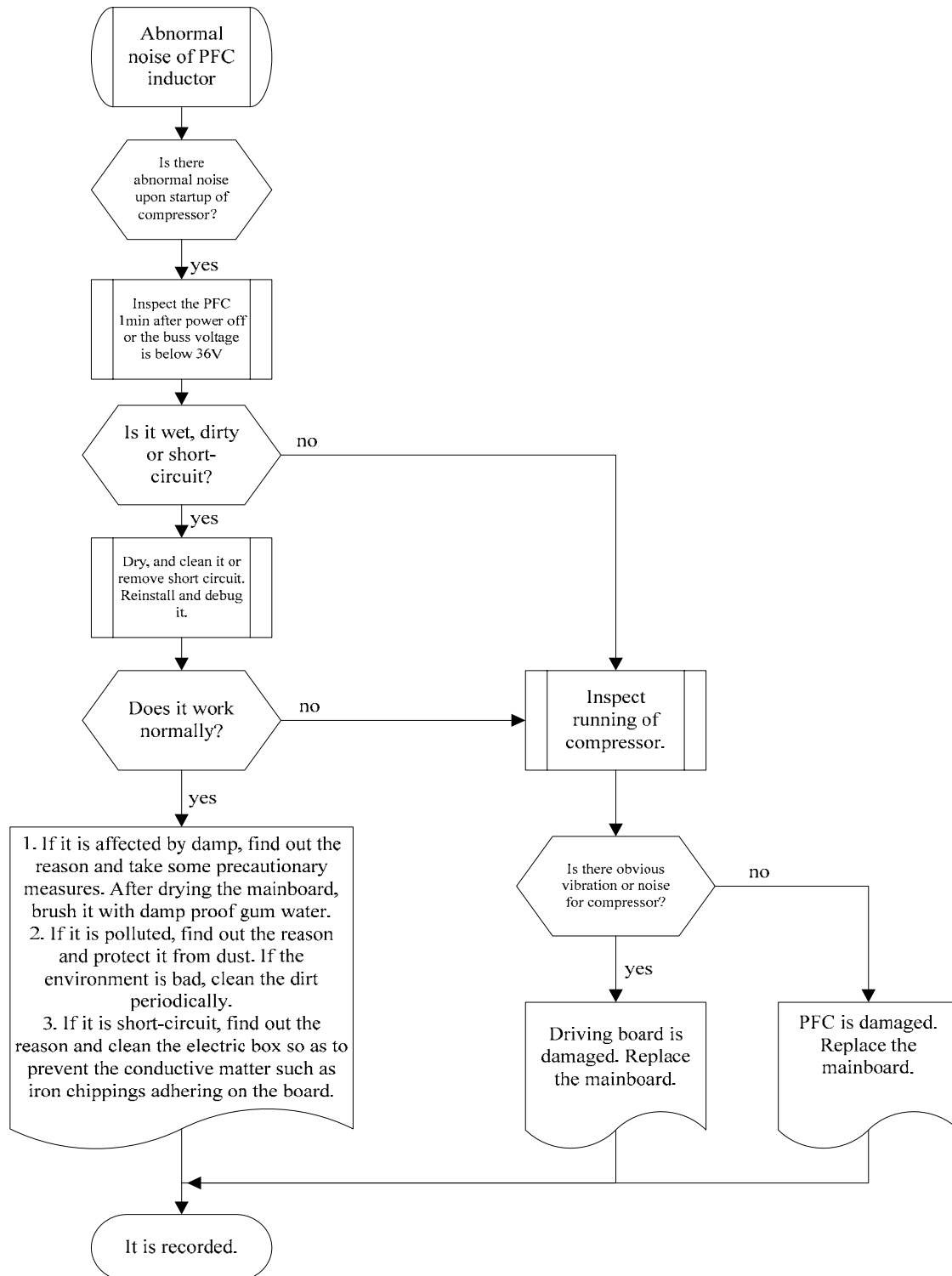


Fig.3.1.4 Flowchart of PFC inductor abnormal noise diagnosis

3.1.5 Superheat Protection of Radiating Fin

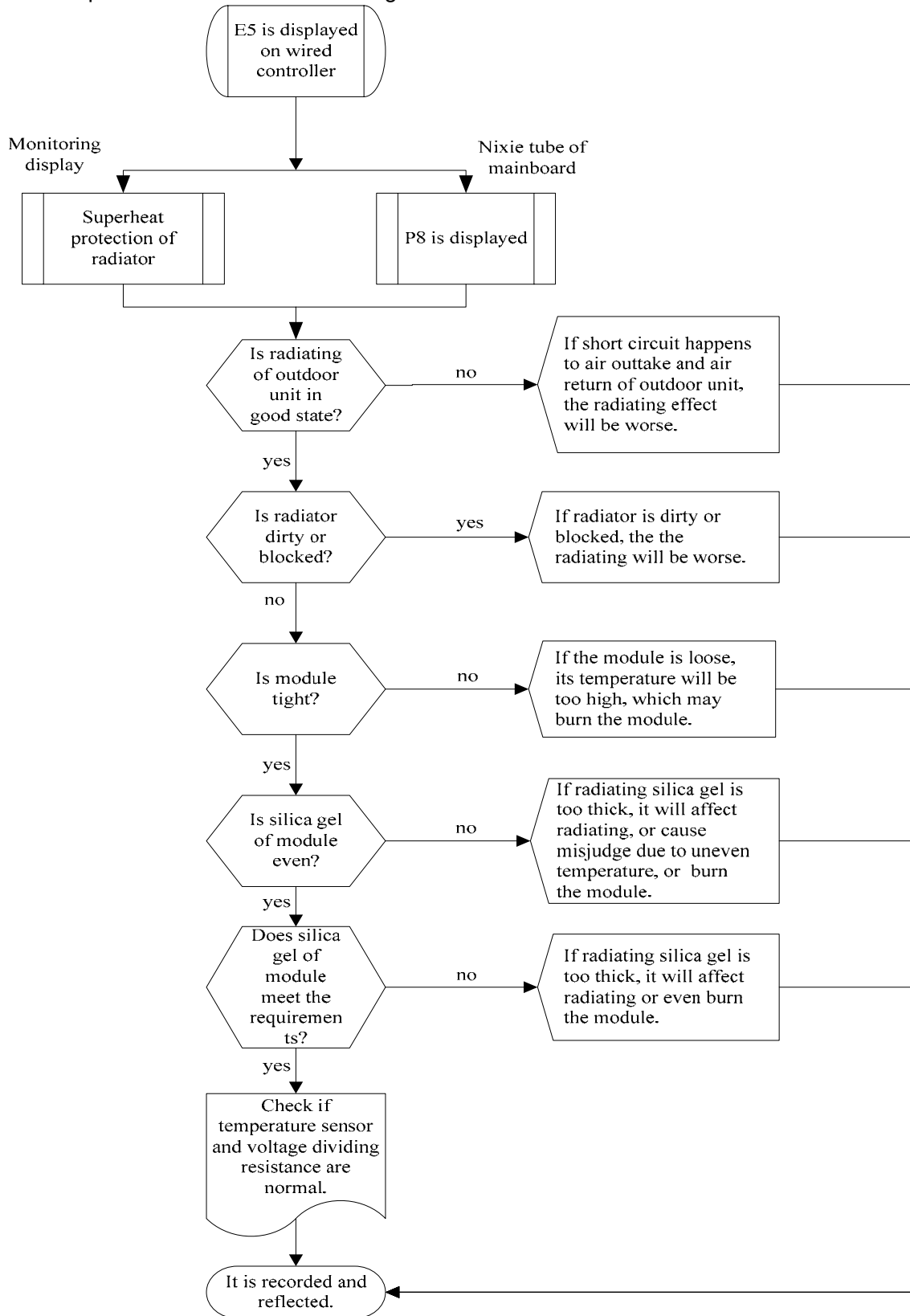


Fig 3.1.5 Flowchart of diagnosis of radiator superheat protection

3.1.6 Overvoltage Protection of DC Bus

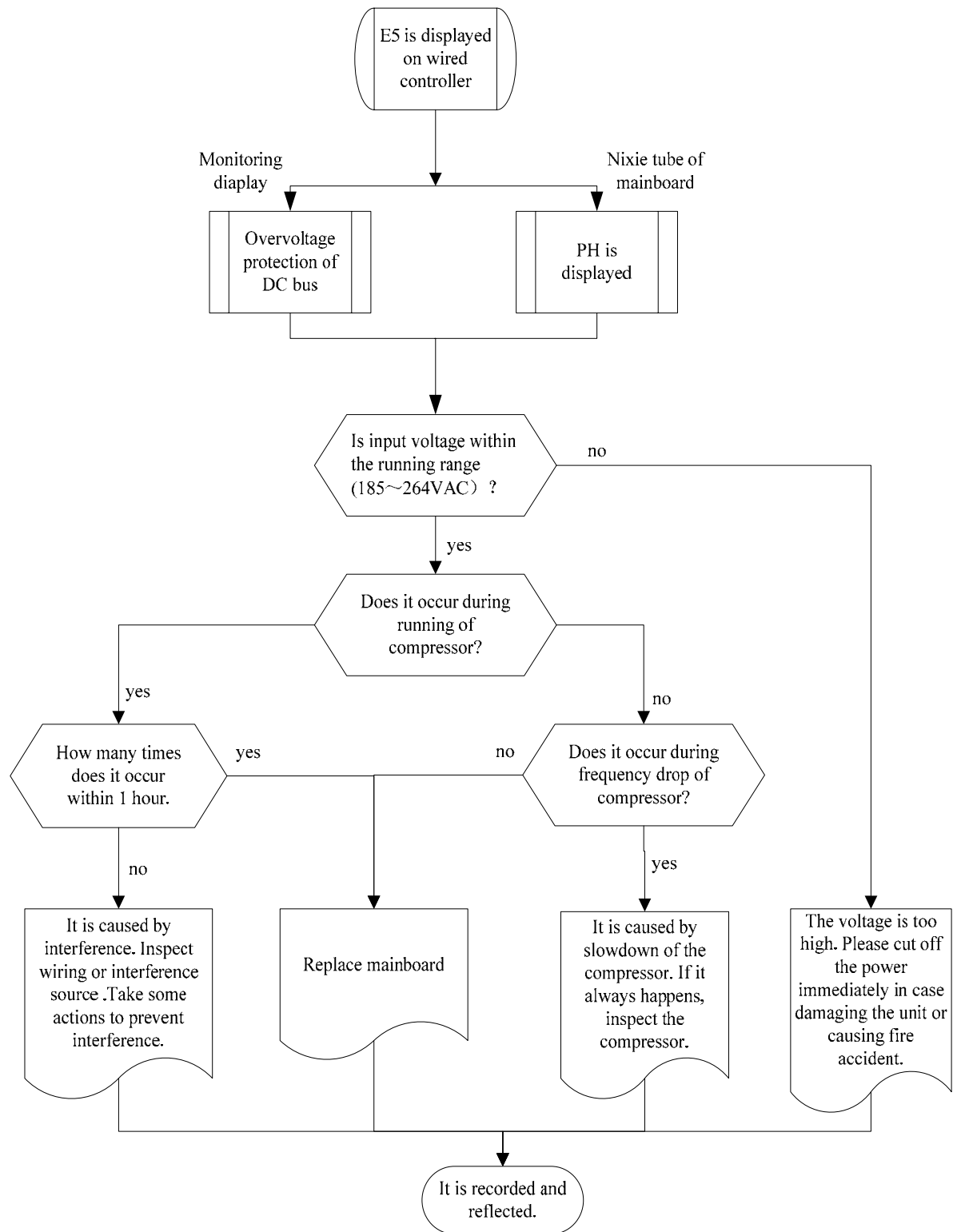


Fig. 3.1.6 Flowchart of diagnosis of DC bus overvoltage protection

3.1.7 Under-voltage Protection of DC bus

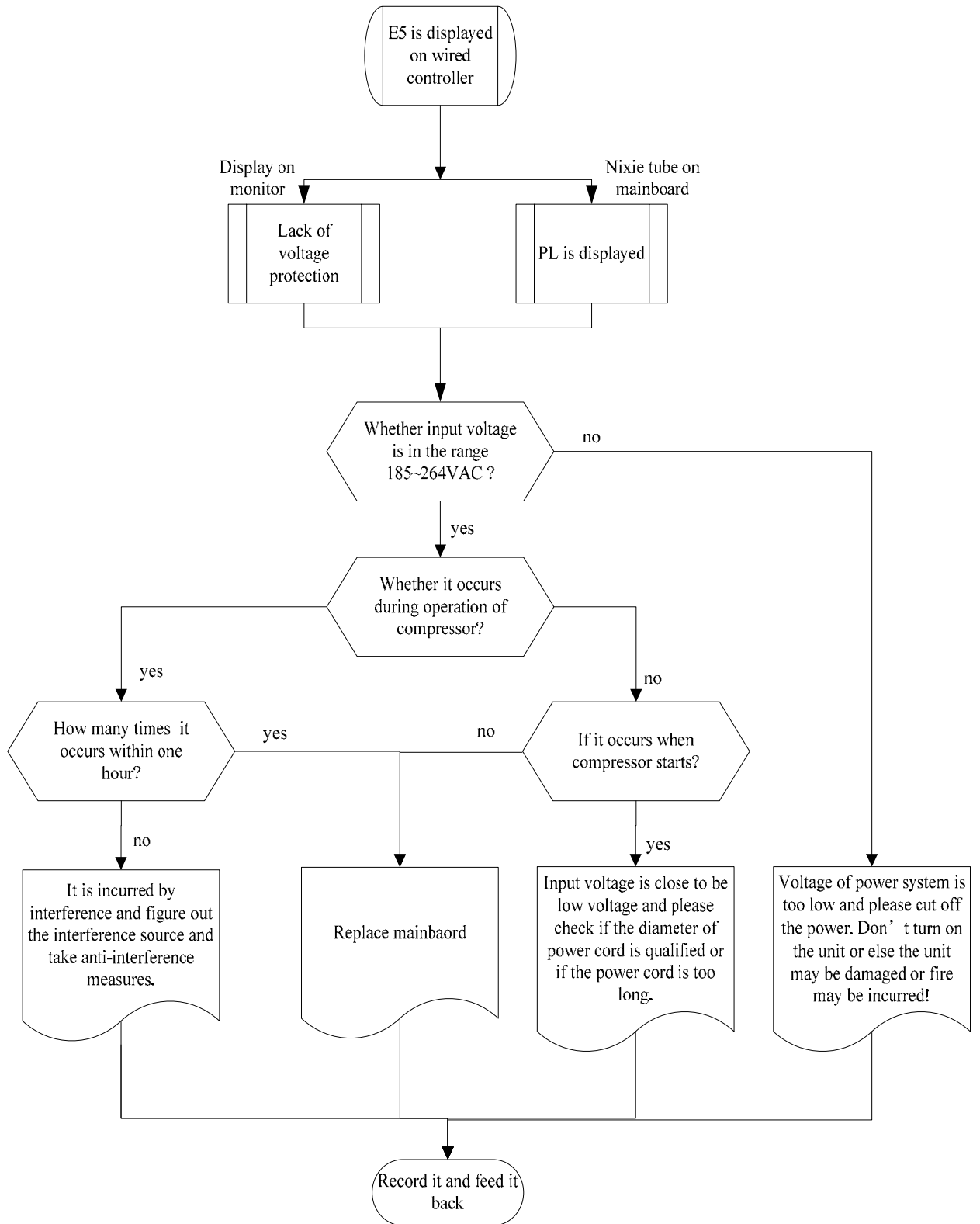


Fig. 3.1.7 Flowchart of diagnosis of DC bus under-voltage

3.2 Diagnosis Flowchart of Driving of Three-phase Unit

3.2.1 IPM Module Protection

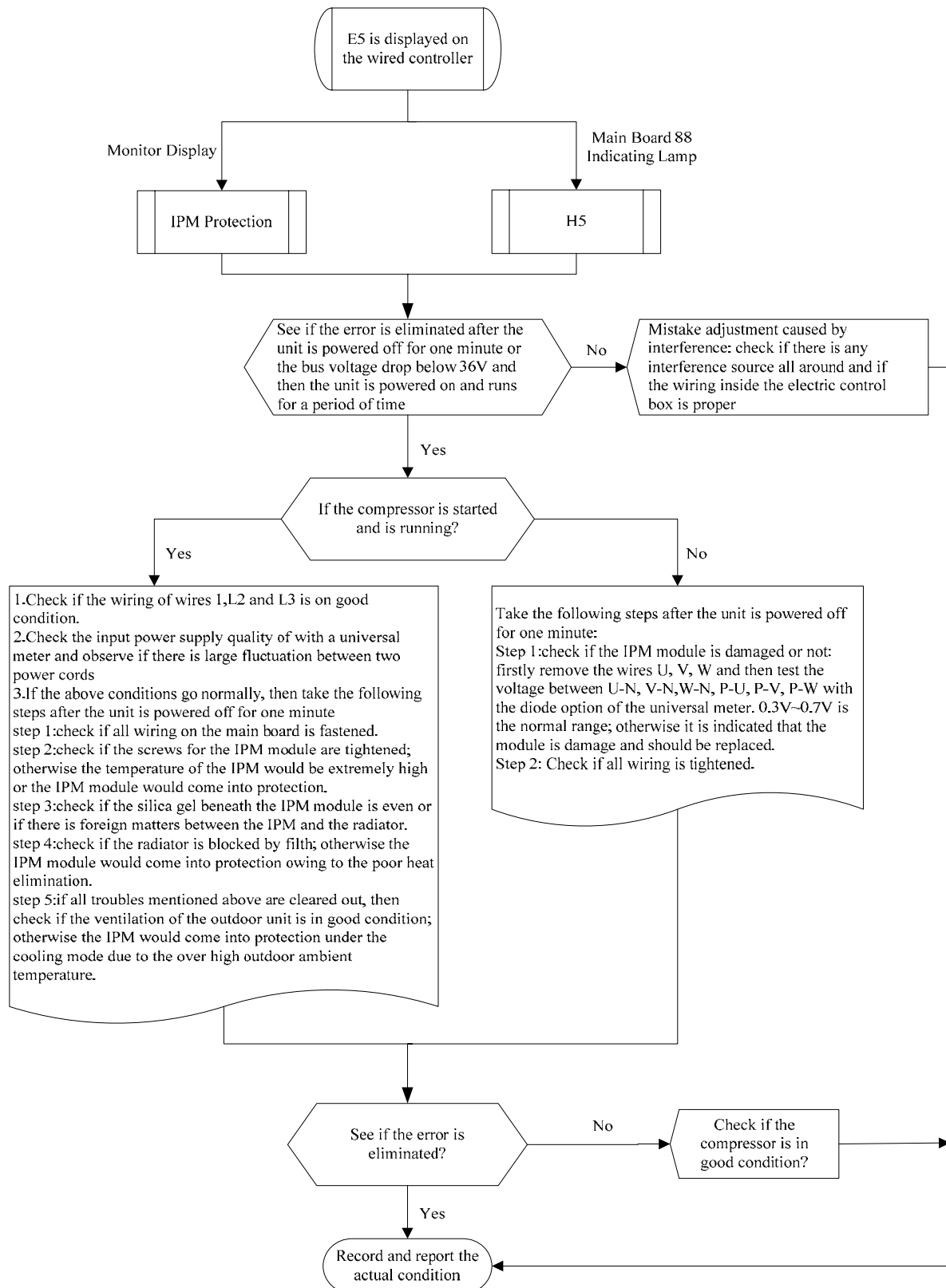


Fig. 3.2.1 Flowchart of diagnosis of IPM Module Protection

Method of Testing IPM Module Short Circuit:

- (1). Preparation before test: prepare a universal meter and turn to its diode option, and then remove the wires U, V, W of the compressor after it is powered off for one minute.
- (2). Testing Steps
 - Step 1: put the black probe on the place P and the red one on the wiring terminal U, V, W respectively as shown in the following figure to measure the voltage between UP, VP and WP.
 - Step 2: put the red probe on the place N and the black one on the wiring terminal U, V, W respectively as shown in the following figure to measure the voltage between NU, NV and NW.
- (3). If the measured voltages between UP, VP, WP, NU, NV, NW are all among 0.3V ~ 0.7V, then it indicates the IPM module is normal; If any measured value is 0, it indicates the IPM is damaged.

