

LUV INVERTER SERIES

Part 2 of 2



Self-diagnostics and Trouble-shooting

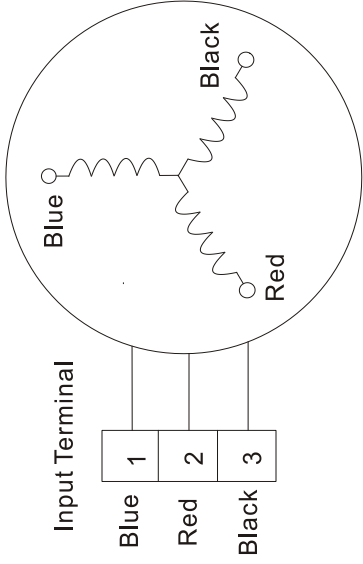
42/38LUV028H
42/38LUV035H
42/38LUV052H
42/38LUV065H
42/38LUV070H
42/38LUV080H



MAJOR COMPONENT CHECKING

COMPRESSOR

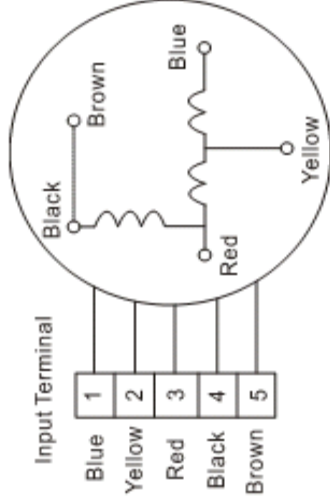
Use a multi-meter to measure the resistance value of each winding.



	Model	Brand	Terminal	Winding Resistance (Ω)
MONO-INV-09-HP-IZ				
MONO-INV-12-HP-IZ	DA108X1C-20FZ3	Toshiba	Blue – Red	0.71 \pm 8% (20 $^{\circ}$ C)
MONO-INV-09-IZ			Blue – Black	
MONO-INV-12-IZ			Red - Black	
MONO-INV-18-IZ	C-6RVN93H0N	Sanyo		0.668 \pm 8% (25 $^{\circ}$ C)
MONO-INV-24-IZ	C-6RZ146H1A	Sanyo		0.452 \pm 8% (25 $^{\circ}$ C)

OUTDOOR FAN MOTOR

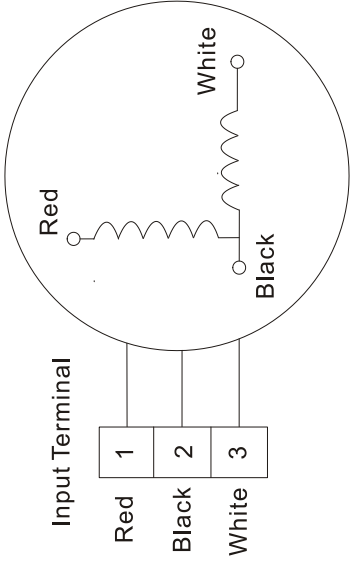
Measure the resistance value of each winding.



	Model	Capacitor	Terminal	Winding Resistance (Ω) (20°C)
MONO-INV-09-HP-IZ	YDK24-6G	2.5 μ F/450VAC	Blue - Red	213 \pm 8%
MONO-INV-12-HP-IZ			Red - Black	435 \pm 8%
MONO-INV-09-IZ			Red - Black	98 \pm 8%
MONO-INV-12-IZ			Blue - Red	147 \pm 8%
MONO-INV-18-IZ	YDK53-6F	2.5 μ F/450VAC	Yellow - Black	97 \pm 8%
MONO-INV-24-IZ	YDK53-6N	2.5 μ F/450VAC	Blue - Red	180 \pm 8%

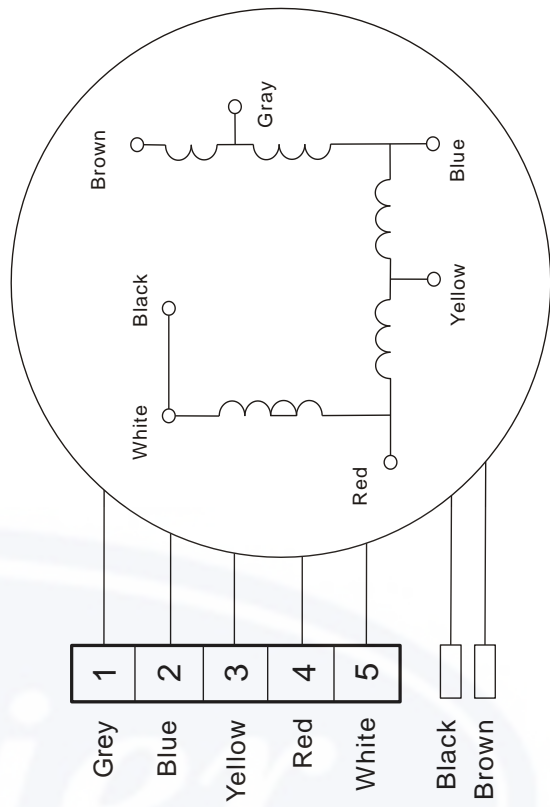
INDOOR FAN MOTOR

Measure the resistance value of each winding.



Red – Black: Main Winding
 Black – White: Auxiliary Winding

Model	Capacitor	Winding Resistance (Main/Aux.) (Ω)
MONO-INV-09-IZ	1.2 μ F/450VAC	375 / 377 \pm 8%
MONO-INV-09-HP-IZ		
MONO-INV-12-HP-IZ	1.5 μ F/450VAC	400 / 383 \pm 8%
MONO-INV-12-IZ		
MONO-INV-18-IZ	1.5 μ F/450VAC	260 / 385 \pm 8%

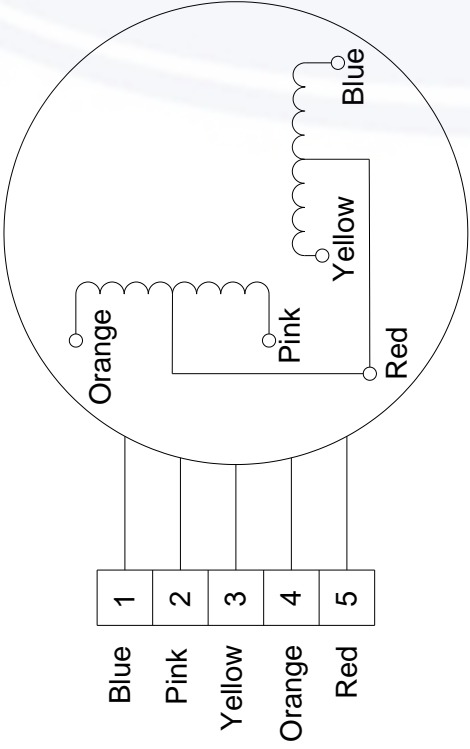


MONO-INV-24-IZ	YDK36-4C	3 μ F/450VAC
Position	Resistance Value	
White - Red	231 Ω \pm 8% (20°C)	
Red - Brown	109 Ω \pm 8% (20°C)	



LOUVRE STEPPER MOTOR

Measure the resistance value of each winding.



MONO-INV-09-HP-IZ	
MONO-INV-12-HP-IZ	MP2835
MONO-INV-09-IZ	
MONO-INV-12-IZ	
MONO-INV-18-IZ	MP2423B
MONO-INV-24-IZ	MP2423

Position	Resistance Value
Orange - Red	200Ω ± 7% (25°C)
Red - Pink	
Yellow - Red	
Red - Blue	

TEMPERATURE SENSORS

Measure the resistance of each and compare with the table provided.

Room temp.(T1) sensor,

Indoor coil temp.(T2) sensor,

Outdoor coil temp.(T3) sensor,

Outdoor ambient temp.(T4) sensor,

Compressor exhaust temp.(Te) sensor.

Measure the resistance value of each winding by using the multi-meter.

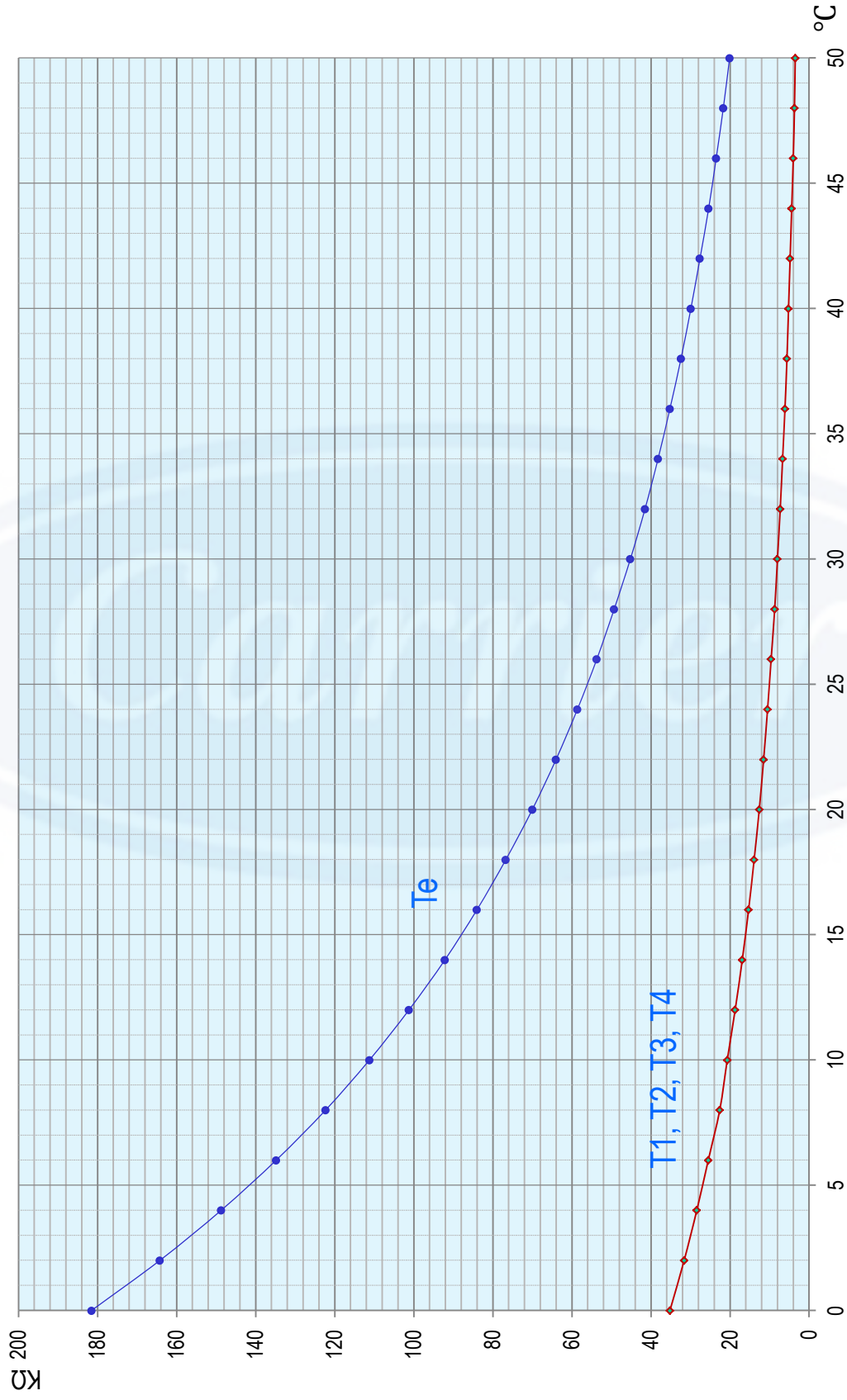
Some frequently-used R-T data for T1, T2, T3 and T4 sensor:

Temperature (°C)	5	10	15	20	25	30	40	50	60
Resistance Value (KΩ)	26.9	20.7	16.1	12.6	10	8	5.2	3.5	2.4

Some frequently-used R-T data for Te sensor:

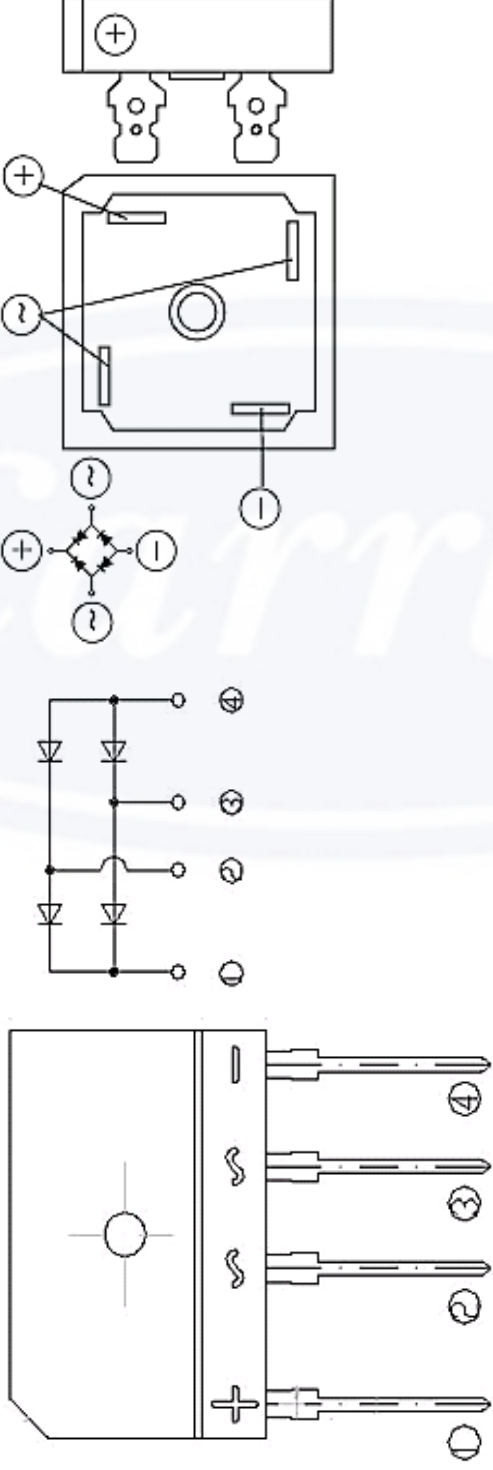
Temperature (°C)	5	15	25	35	60	70	80	90	100
Resistance Value (KΩ)	141.6	88	56.1	36.6	13.8	9.7	6.9	5	3.7

TEMPERATURE, RESISTANCE TABLE - ALL SENSORS



RECTIFIER CHECKING

- Turn off the power and let the inverter electrolytic capacitor (C01, C02, C03) discharge completely. Use a suitable tester to check continuity.
- When using a digital tester, the (+) and (-) tester lead wires in the table must be reversed.



Needle-type tester	Normal resistance value
+	∞ (several M Ω)
~	
-	

Value in () is for digital tester.

INTELLIGENT POWER MODULE [IPM] CHECKING

- Turn off the power and allow the large electrolytic capacitors (C01,C02,C03) to discharge completely.
Dismount the IPM.
- Using a tester, check for leakage current between C and E
- When using a digital tester, the (+) and (-) tester lead wires must be reversed as shown in the 2 tables below.

Needle-type tester		Normal resistance value
(-)	(+)	
P	N	∞ (several M Ω)
	U	
	V	
	W	

Values in () are for digital tester.

Needle-type tester	Normal resistance value	
	(-)	(+)
U		∞ (several M Ω)
V	N	
W		

Values in () are for digital tester.

LUV HIGHWALL INVERTER ADVANCED DIAGNOSTICS

38LUV028/35H [Compressor DA108X1C-23EZ]

MAIN PCB

Main Chip	IRMCK341
Indicator	LED1
Colour	Blue
Function	Indicates chip status

Action	Meaning
Flashing slow [0.5Hz]	Standby
Energised [steady]	Normal
Flashing fast [2.5Hz]	System error



38LUV052 [Compressor DA130S1C-20FZ]

MAIN PCB

Main Chip	[TMP86P807NG]
Indicator	LED 1
Colour	Yellow
Function	Indicates chip status

Action	Meaning
Flashing slow [0.5Hz]	Standby
Energised [steady]	Normal operation
Flashing fast [2.5Hz]	System error

Power	[+5V DC]
Indicator	LED 4
Colour	Red
Function	Indicates DC volts

Action	Meaning
Energised [steady]	DC power
Off	No power

341 Chip	[Sensorless motor control IC for appliances]	
Indicators	LED 5	LED 6
Colour	Red	Green
Function	Indicates chip status	

See table below

Red LED	Green LED	Meaning	Indoor Code
Off	On	Standby mode	None
On	Off	Normal operation	None
Off	Flash	IGBT over current protection	P0
On	On	DC voltage upper or lower limit exceeded	P1
Flash	On	Chip engine error	P1
Flash	Off	Chip engine start error	P4
On	Flash	Chip engine phase missing	P4
Flash	Flash	Communication error	P4

38LUV052H-1 [Compressor DA130M1C-31FZ]

MAIN PCB

Main Chip	TMP86FH09ANG
Indicator	LED 2
Colour	Yellow
Function	Indicates chip status

Action	Meaning
Flashing slow [0.5Hz]	Standby
Energised [steady]	Normal operation
Flashing fast [2.5Hz]	System error

Power	+5V DC
Indicator	LED 1
Colour	Red
Function	Indicates DC volts present

Action	Meaning
Energised [steady]	DC power normal
Off	No power

341 Chip	Sensorless motor control IC for appliances	
Indicators	LED 4	LED 3
Colour	Red	Green
Function	Indicates chip status	

See table below

Red LED	Green LED	Meaning	Indoor Code
Off	On	Standby mode	None
On	Off	Normal operation	None
Off	Flash	IGBT over current protection	P0
On	On	DC voltage upper or lower limit	P1 or P10 or P11 or P12
Flash	Off	Compressor speed out of control	P4 or P46
On	Flash	Chip engine phase missing	P4 or P43 or P44 or P45
Flash	Flash	Communication error	P4 or P40
Flash	On	Chip 341 – EPROM error	E5

38LUV065/70H [Compressor DA150S1C-20FZ]

MAIN PCB

Main Chip	TMP86P807NG
Indicator	LED 1
Colour	Yellow
Function	Indicates chip status

Action	Meaning
Flashing slow [0.5Hz]	Standby
Energised [steady]	Normal operation
Flashing fast [2.5Hz]	System error

Power	+5V DC
Indicator	LED 4
Colour	Red
Function	Indicates DC volts

Action	Meaning
Energised [steady]	DC power
Off	No power

341 Chip	Sensorless motor control IC for appliances	
Indicators	LED 5	LED 6
Colour	Red	Green
Function	Indicates chip status	

See table below

Red LED	Green LED	Meaning	Indoor Code
Off	On	Standby mode	None
On	Off	Normal operation	None
Off	Flash	IGBT over current protection	P0
On	On	DC voltage upper or lower limit exceeded	P1
Flash	On	Chip engine error	P1
Flash	Off	Chip engine start error	P4
On	Flash	Chip engine phase missing	P4
Flash	Flash	Communication error	P4

38LUV080H [Compressor DA250S2C-30MT]

MAIN PCB

Main Chip	TMP86FH46NG
Indicator	LED 1
Colour	Yellow
Function	Indicates chip status

Action	Meaning
Flashing slow [0.2Hz]	Standby
Energised [steady]	Normal operation
Flashing fast [2.5Hz]	System error

Power	+5V DC
Indicator	LED 2
Colour	Red
Function	Indicates DC volts present

Action	Meaning
Energised [steady]	DC power normal
Off	No power

IPM PCB

Intelligent Power Module			
Indicator	LED 1	LED 2	LED 3
Colour	Red	Green	Red
Function	Indicates status [see below]		DC Power

Red LED 1	Green LED 2	Red LED 3	Meaning	I/dr. Code	
On	Off	Off	No power	Standby mode	None
Off	On			Normal operation	None
Flash	Off			IGBT current protection	P0
On	On			DC voltage limit exceeded	P1
Off	Flash	On	Power normal [+3.3V DC]	Compressor speed control	P4
Flash	On			Chip engine phase missing	P4
Flash	Flash			Communication error	P4
On	On			Reserved for future use	None

LUV
Generation 2
TROUBLE SHOOTING

Carrier



INDOOR UNITS

Indoor Unit Error Display

Display	LED STATUS
E0	EEPROM parameter error
E1	Indoor / outdoor units communication protection
E2	Zero-crossing signal error
E3	Indoor fan speed has been out of control
E5	Open circuit or short circuit of outdoor temperature sensor or outdoor unit EEPROM parameter error
E6	Open circuit or short circuit of room or evaporator temperature sensor
P0	IPM malfunction or IGBT over-strong current protection
P1	Over voltage or too low voltage protection
P2	Temperature protection of compressor top.
P4	Inverter compressor drive error

Note: E4 & P3: Reserved function.

Diagnosis and Solution

1. EEPROM parameter error diagnosis and solution

Shut off the power supply and turn it on 5 seconds later. Is it still displaying the error code?

Yes

If the EEPROM chip is welded on PCB, replace the PCB directly. Otherwise, check whether the EEPROM chip plugged in PCB well?

No

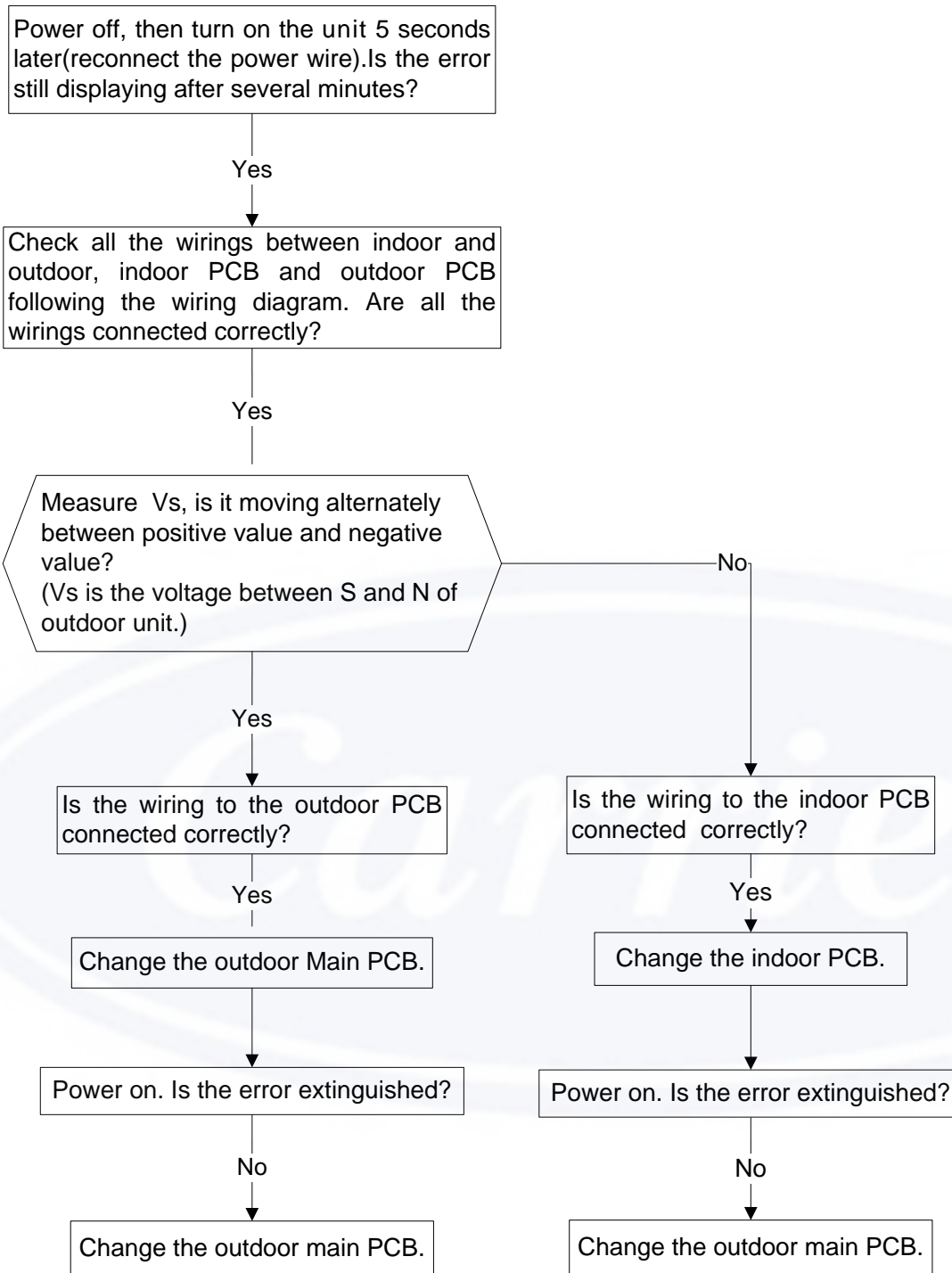
Correct the connection.

Yes

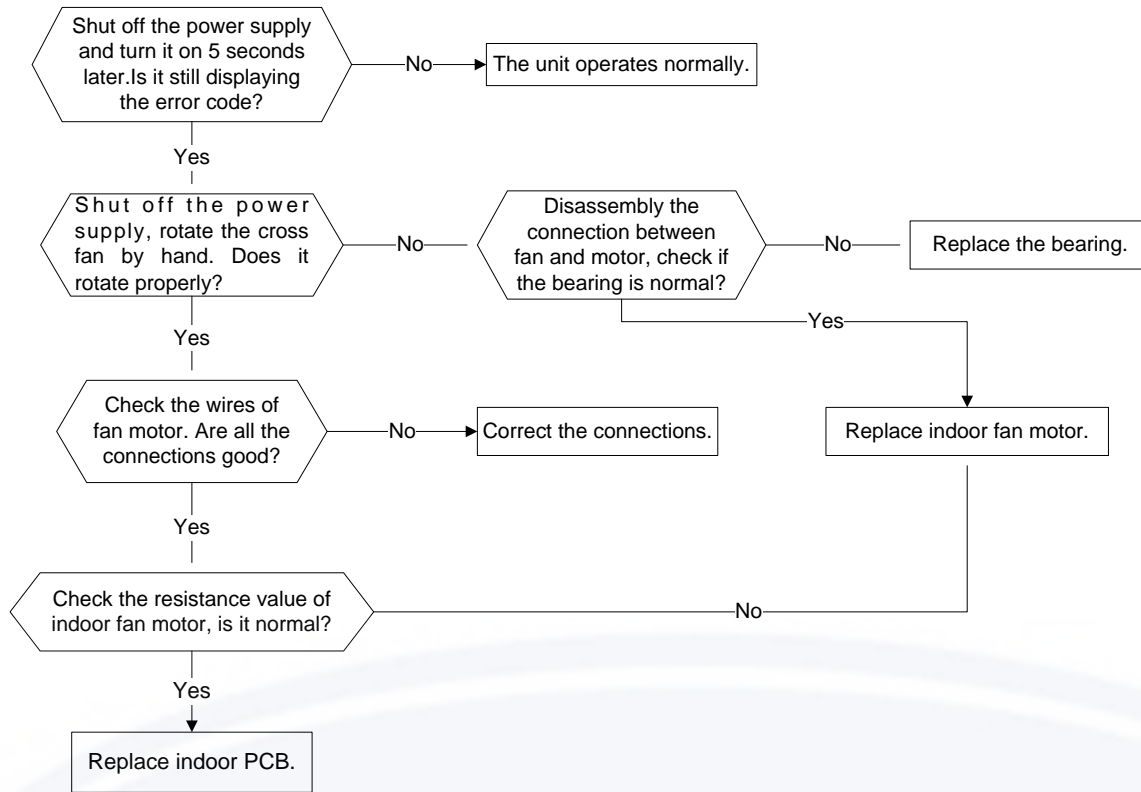
Replace the indoor PCB.

The Carrier logo is a large, light blue oval with the word "Carrier" written in a white, cursive font across the center.

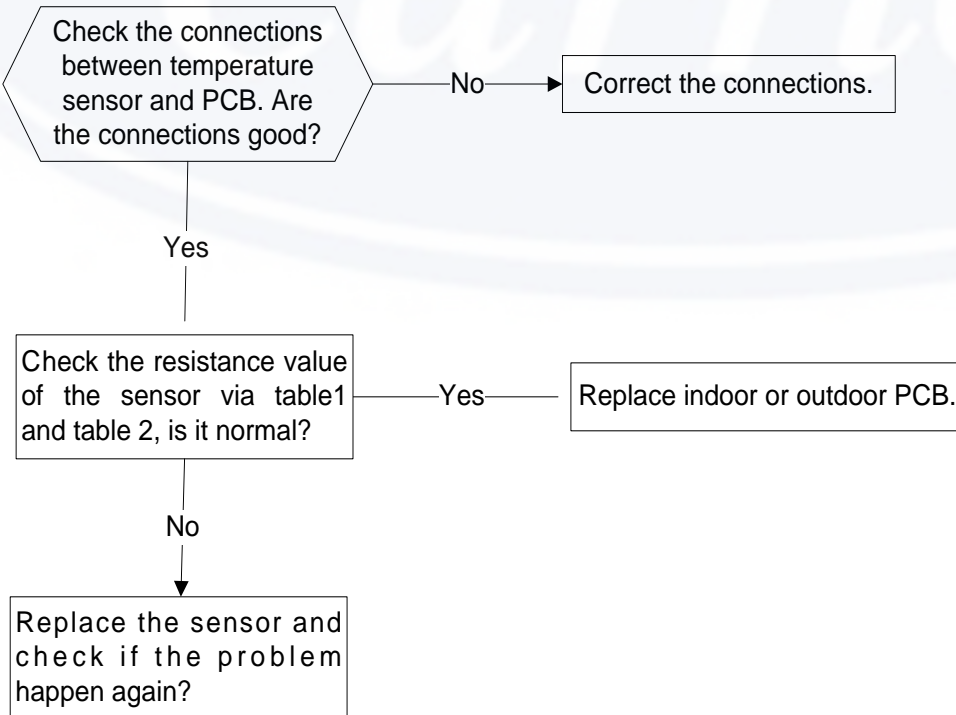
2. Indoor unit and outdoor unit communication protection error diagnosis and solution



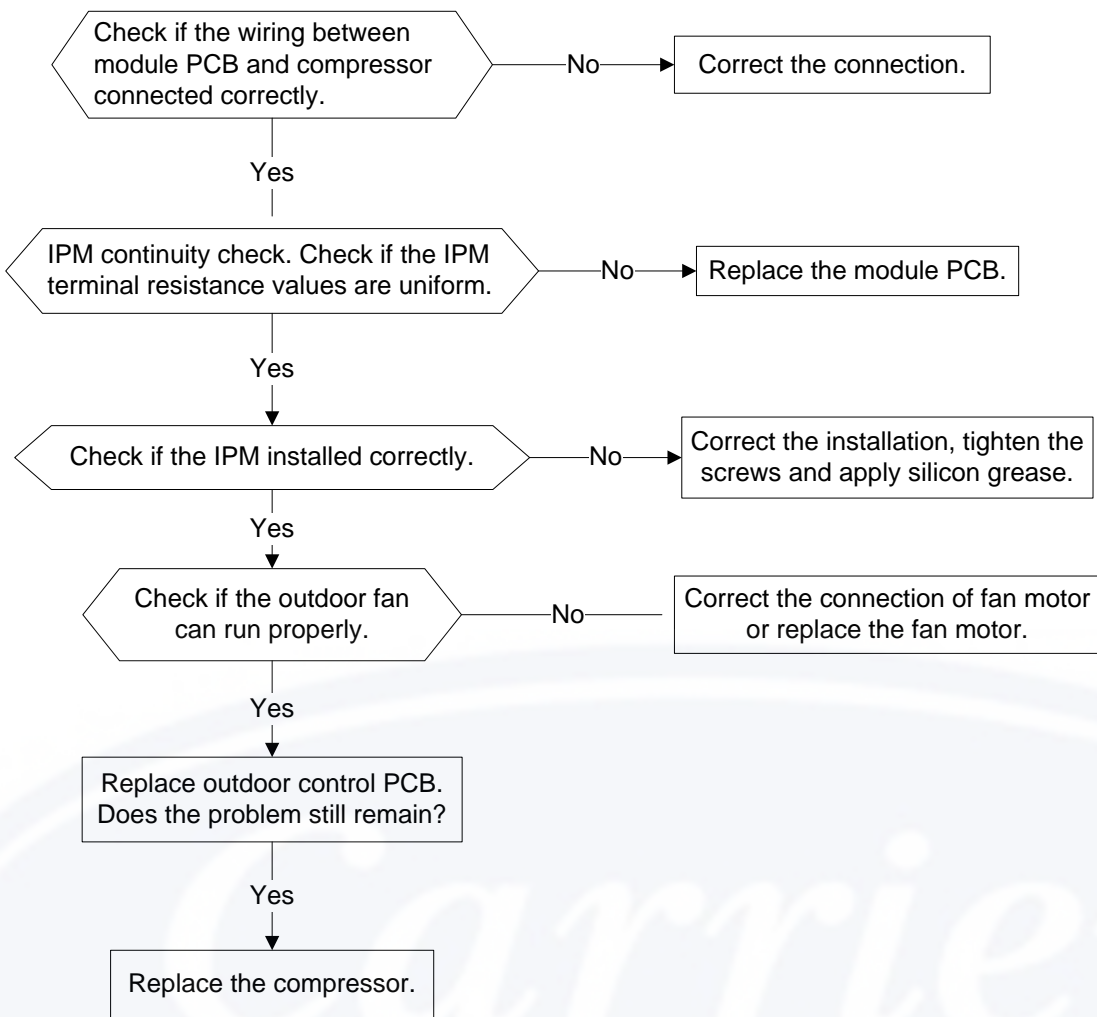
3. Indoor fan speed has been out of control diagnosis and solution



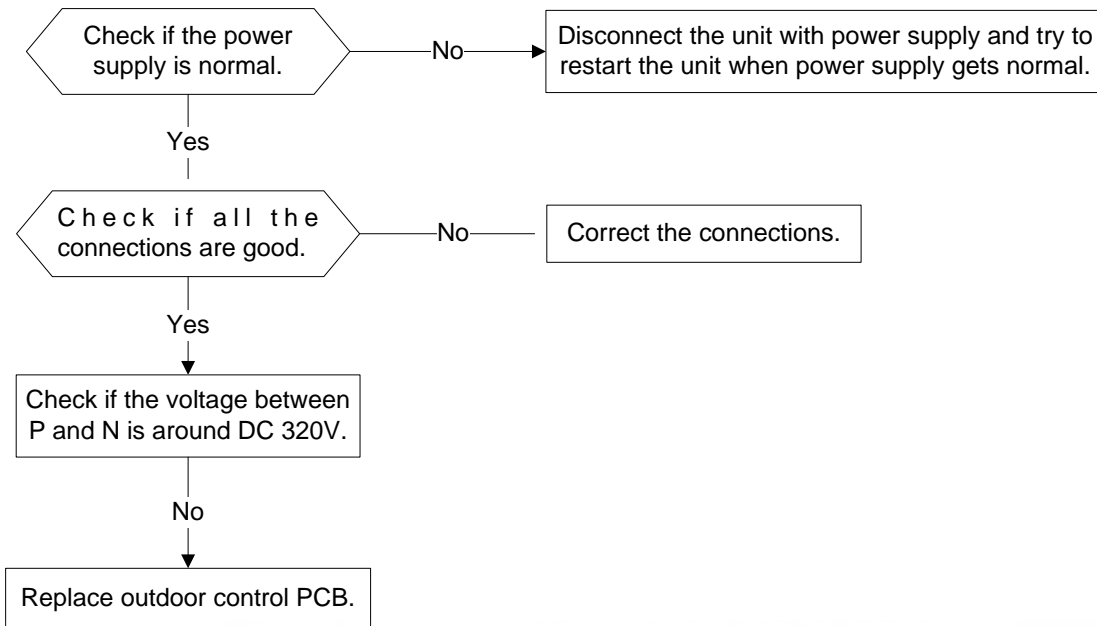
4. Open circuit or short circuit of temperature sensor diagnosis and solution



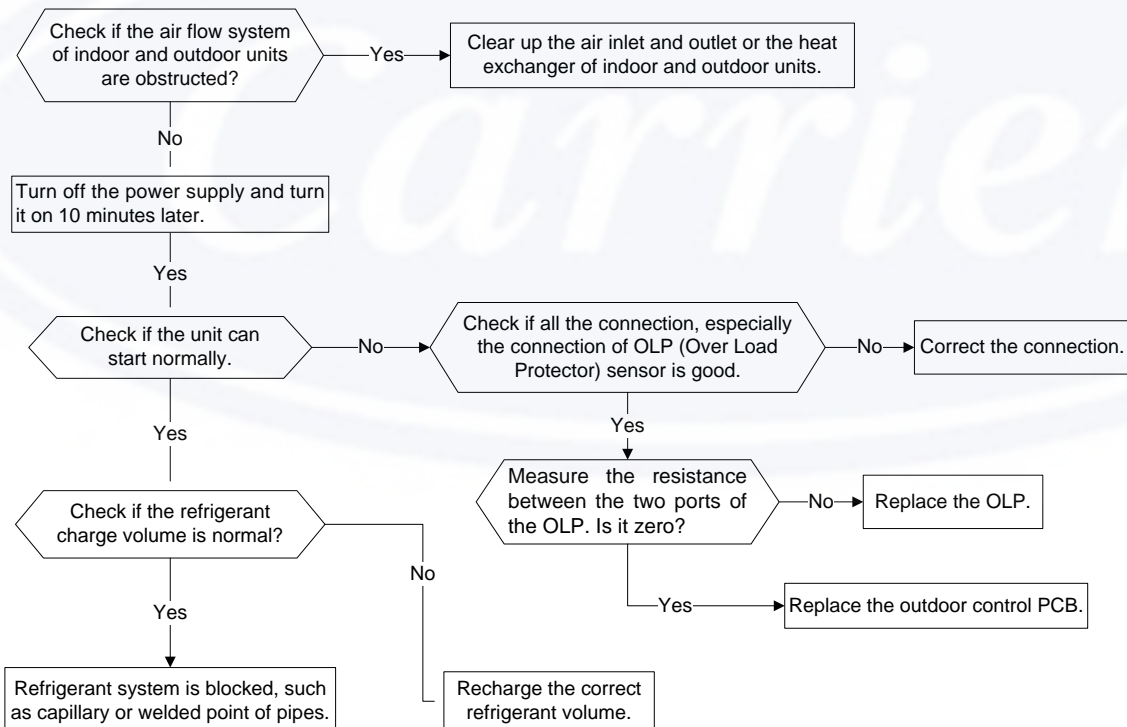
5. IPM malfunction or IGBT over-strong current protection diagnosis and solution



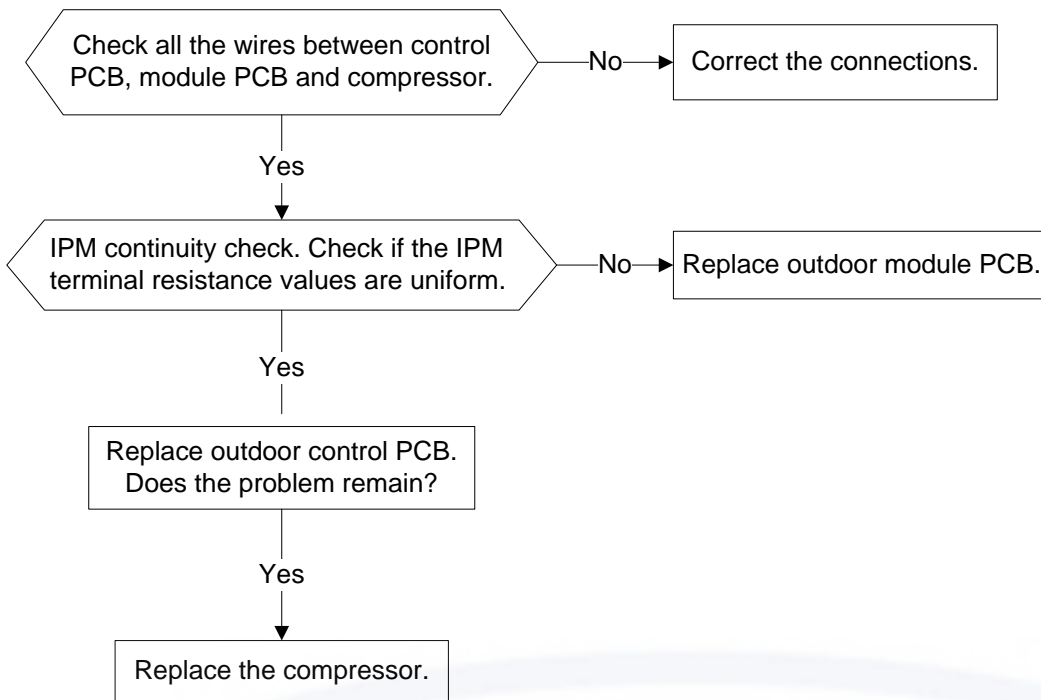
6. Over voltage or too low voltage protection diagnosis and solution



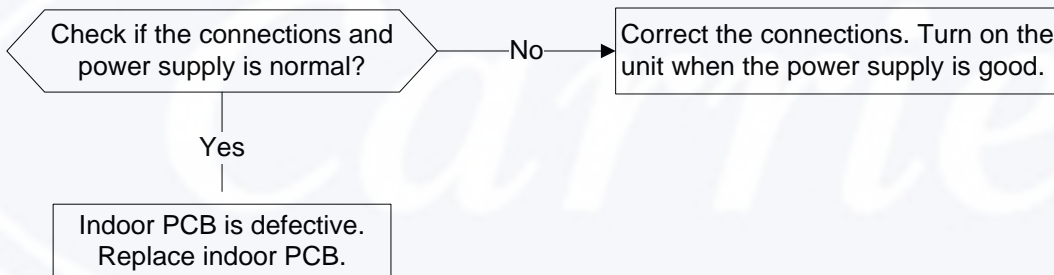
7. High temperature protection of compressor top diagnosis and solution



8. Inverter compressor drive error diagnosis and solution

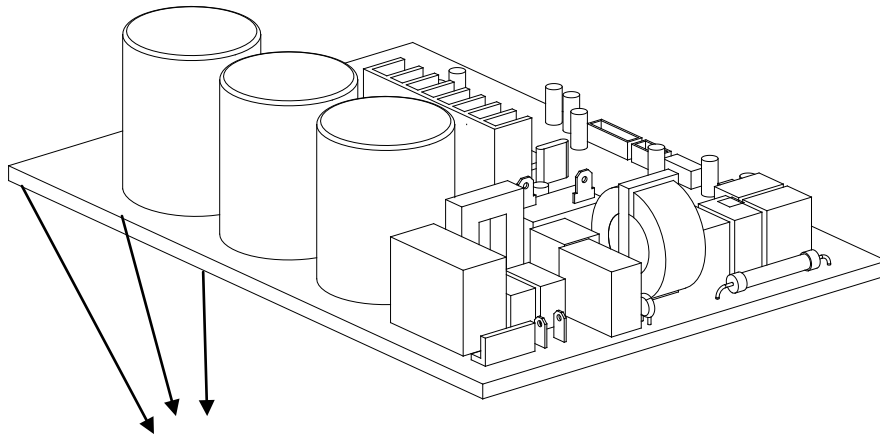


9. Zero crossing detection error diagnosis and solution



Safety

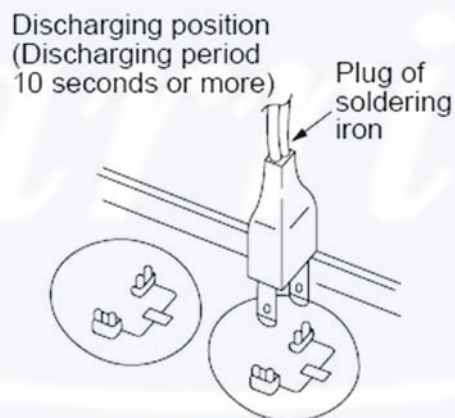
Electricity power is still kept in capacitors even the power supply is shut off. Do not forget to discharge the electricity power in capacitor.



Electrolytic Capacitors

(HIGH VOLTAGE! CAUTION!)

Connect discharge resistance (approx.100Ω 40W) or soldering iron (plug) between +, - terminals of the electrolytic capacitor on the contrary side of the outdoor PCB.

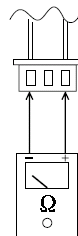


Note: The picture above is only for reference. The plug of your side may be different.

Main parts check

1. Temperature sensor checking

Disconnect the temperature sensor from PCB, measure the resistance value with a tester.



Tester

Temperature Sensors.

Room temp.(T1) sensor,

Indoor coil temp.(T2) sensor,

Outdoor coil temp.(T3) sensor,

Outdoor ambient temp.(T4) sensor,

Compressor discharge temp.(T5) sensor.

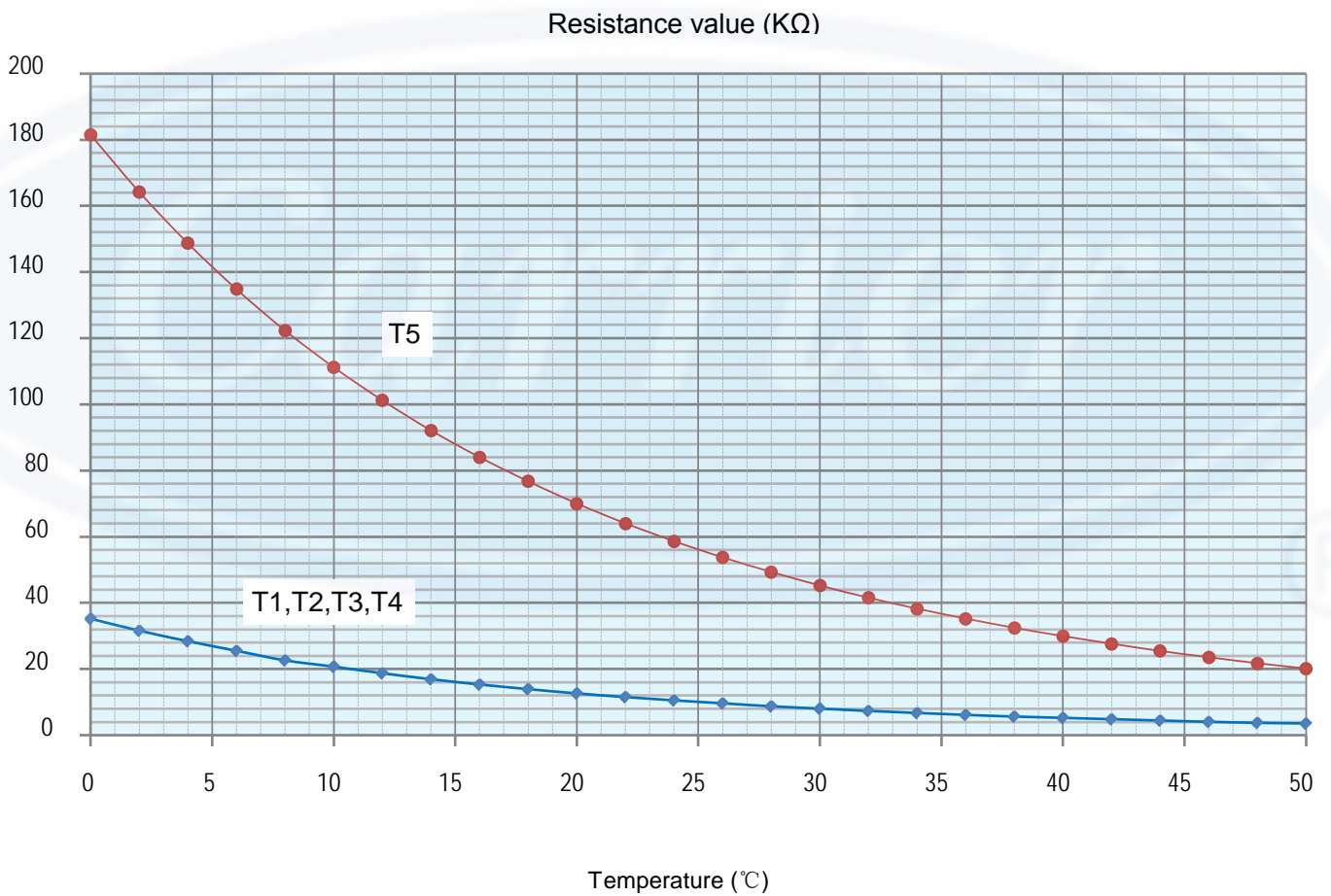
Measure the resistance value of each winding by using the multi-meter.

Table 1:Some frequently-used R-T data for T1,T2,T3 and T4 sensor:

Temperature (°C)	5	10	15	20	25	30	40	50	60
Resistance Value (KΩ)	26.9	20.7	16.1	12.6	10	8	5.2	3.5	2.4

Table 2:Some frequently-used R-T data for T5 sensor:

Temperature (°C)	5	15	25	35	60	70	80	90	100
Resistance Value (KΩ)	141.6	88	56.1	36.6	13.8	9.7	6.9	5	3.7



LAK Self Diagnostics

The LED mounted on the Low Ambient Kit [LAK] provides indication of the following:

Type	Contents	LED Flashing
Error	LAK ambient temp. sensor fault	Flashes 7 times and then off for 2.5s, cyclically
Error	Zero crossing signal fault	Flashes 6 times and then off for 2.5s, cyclically
Error	LAK pipe temp. sensor fault	Flashes 5 times and then off for 2.5s, cyclically
Normal	Power supply: 50Hz, working in heating mode	Flashes 4 times and then off for 2.5s, cyclically
Normal	Power supply: 50Hz, working in cooling mode	Flashes 3 times and then off for 2.5s, cyclically

Carrier



38LUV GEN1 AND 2 PCBs EXPLAINED

On the original residential inverters, some models had a separate PCB for outdoor fan speed control. This PCB is called a low ambient kit [LAK].

2nd generation products now all have this low ambient control feature combined into the main PCB.

Not all 2nd generation PCB's are backward compatible with 1st generation indoor units.

Be very specific about what product you have when ordering replacement spare parts.

This includes the PCBs, reactors and compressors.

Model	Generation 1	Generation 2	Comments
38LUV28	1 PCB		LAK & main PCB combined
38LUV35	1 PCB		LAK & main PCB combined
38LUV52	2 PCB's		LAK separate from main PCB
38LUV65	2 PCB's		LAK separate from main PCB
38LUV70	2 PCB's		LAK separate from main PCB
38LUV80	1 PCB		LAK & main PCB combined
38LUV52		1 PCB	LAK & main PCB combined
38LUV065H		1 PCB	LAK & main PCB combined
38LUV070H		1 PCB	LAK & main PCB combined

Carrier

