Service Manual

GE APPLIANCES

Single-Zone
Ductless Multi-Split Heat Pumps

ENDURE™

Model Lineup:

Outdoor Models

Appearances vary by model

1G09ED2BEA
1G12ED2BEA

1G18ED2BEA

Indoor Models

Appearances vary by model

Wall Mount - Highwall
GS09WP2BEA
GS12WP2BEA
GS18WP2BEA

Cassette
US09CB2BEA
US12CB2BEA
US18CB2BEA

Mid-Static Ducted
US09MB2BEA
US12MB2BEA
US18MB2BEA

Console
US09FB2BEA
US12FB2BEA
US18FB2BEA

Before troubleshooting or servicing equipment, review equipment installation guides and confirm ALL installation requirements & specifications have been met. Including, but not limited to: wiring, clearance, ducting (where applicable), power, and line set requirements. Correct any installation issues before continuing.

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AIR&WATER SOLUTIONS

GE APPLIANCES

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SAFETY & PRECAUTIONS

FOLLOW ALL WARNINGS, CAUTIONS, AND PRECAUTIONS BELOW, AND INDUSTRY BEST SAFETY PRACTICES AND STANDARDS. FAILURE TO DO SO MAY RESULT IN EQUIPMENT DAMAGE OR FAILURE, AND SERIOUS PERSONAL INJURY OR DEATH.

WARNINGS
Service should be performed by the dealer or another professional. Improper service may cause water leakage, electrical shock, or fire.
Use only the supplied or specified service parts. Use of other parts may cause the unit to come lose, water leakage, electrical shock, or fire.
The heat pump must be installed on a solid base that can support the unit's weight. An inadequate base or incomplete installation may cause injury in the event the unit falls off the base.
Electrical work should be carried out in accordance with the manual and national/local electrical wiring codes and rules of practice. Insufficient capacity or incomplete electrical work may cause electrical shock or fire.
A dedicated power circuit must be used. The power supply should NEVER be shared by another appliance.
Wiring cable must be long enough to cover the entire distance with no splices. Do not use an extension cord. Do not put other loads on the power supply, use a dedicated power circuit. Failure to do so may cause abnormal heat, electric shock or fire.
Only the specified wire types may be used for electrical connections between the indoor and outdoor units. Firmly clamp the interconnecting wires so they receive no external stresses. Incomplete connections or clamping may cause terminal overheating or fire.
Wiring must not put undue stress or tension on the electrical covers or panels. Install covers over the wires. Incomplete cover installation may cause terminal overheating, electrical shock, or fire.
If any refrigerant has leaked out during service work, ventilate the room. The refrigerant produces a toxic gas if exposed to flame.
After all service is complete, check for and repair any system refrigerant leaks. The refrigerant produces a toxic gas if exposed to flames.
When servicing or relocating the system, keep the refrigerant circuit free from substances other than the specified refrigerant (R454B), such as air or moisture The presence of air or other foreign substance in the refrigerant circuit causes an abnormal pressure rise or rupture, resulting in injury.
During pump-down, stop the compressor before removing the refrigerant piping. If the compressor is still running, and the stop valve is open during pump-down, air will be sucked into the system while the compressor is running. This will cause abnormal pressure and noncondensables added to the system.
Unit must NOT be grounded to a utility pipe, arrester, or telephone line ground. An complete ground may cause electrical shock, or fire. A high surge current from lightning or other sources may cause damage to the heat pump.

CAUTIONS
The heat pump must not be installed in a place where there is danger of exposure to flammable gas. If the gas builds up around the unit, it may catch fire.
Drain piping must comply with installation guidelines. Inadequate piping may cause flooding.
Tighten flare nuts according to the specified torque using a torque wrench. If flare nuts are overtightened, they may eventually crack and cause refrigerant leakage.
Ensure proper clearances around unit per installation guidelines.

SPECIFICATIONS

NOTE

Our continued commitment to quality products may mean a change in specifications without notice.
Visit GEAppliancesAirandWater.com to access current specification tables online.

	Outdoor Unit	1G09ED2BEA	1G12ED2BEA	1G18ED2BEA
	Indoor Unit	**GS09WP2BEA**	**GS12WP2BEA**	**GS18WP2BEA**
Cooling	Rated Capacity Btu/hr	9,000	12,000	17,000
	Capacity Range Btu/hr	3,200-10,000	4,200-13,000	6,000-18,500
	SEER2	27	25	20.5
	EER2	12.5	12.5	12
	Moisture Removal Pt./hr	2.30	3.80	4.80
Heating	Rated Heating Capacity 47°F Btu/hr	10,000	14,500	19,000
	Heating Capacity Range Btu/hr	3,600-12,000	3,600-15,500	5,600-21,000
	HSPF2 (IV)	11.0	11.0	10.0
	Rated Heating Capacity 5°F Btu/hr	10,000	14,500	19,000
	Heating Capacity at 5°F / Capacity at 47°F	100%	100%	100%
	COP 5°F	1.8	1.8	1.8
Operating Range	Cooling (Without Wind Baffle or Top Cover)	23~115°F (-5~46°C)	23~115°F (-5~46°C)	23~115°F (-5~46°C)
	Heating	-31~75°F (-35~24°C)	-31~75°F (-35~24°C)	-31~75°F (-35~24°C)
Power Supply	Voltage, Cycle, Phase (V/Hz/-)	208-230/60/1	208-230/60/1	208-230/60/1
	Maximum Fuse Size A	20	20	30
	Minimum Circuit Amp A	13	14	20
Outdoor Unit	Compressor Type	DC Inverter Rotary	DC Inverter Rotary	DC Inverter Rotary
	Outdoor Noise Level dB	54	55	60
	Dimension: H x W x D in (mm)	25 1/4 x 35 3/8 x 12 (642 x 898 x 306)	25 1/4 x 35 3/8 x 12 (642 x 898 x 306)	27 3/4 x 38 3/8 x 13 3/8 (705 x 974 x 340)
	Weight (Net/Ship) - lbs (kg)	83.41/96.87 (37.8/43.9)	88.15/100.4 (39.95/45.5)	104.59/122.46 (47.4/55.5)
	Basepan Heater	Yes	Yes	Yes
Indoor Unit	Fan Speed Stages	5 + Auto	5 + Auto	5 + Auto
	Airflow CFM: Cooling (Turbo/High/Med/Low/Quiet)	395/355/310/260/170	410/370/280/210/170	580/530/480/400/350
	Airflow CFM: Heating (Turbo/High/Med/Low/Quiet)	395/355/290/220/170	420/390/350/310/180	580/530/450/350/320
	Indoor Sound Level dB: Cooling (Turbo/High/Med/Low/Quiet)	44/42/36/32/27	46/44/38/32/25	51/50/44/37/25
	Indoor Sound Level dB: Heating (Turbo/High/Med/Low/Quiet)	43/41/37/32/29	43/42/39/36/25	49/47/40/35/26
	Auto Up-Down Louver	Yes	Yes	Yes
	Auto Left-Right Louver	Yes	Yes	Yes
	Drain Pipe Size O.D in	5/8	5/8	5/8
	Dimension: H x W x D in (mm)	12 1/4 x 36 x 8 3/8 (312 x 914 x 213)	12 1/4 x 36 x 8 3/8 (312 x 914 x 213)	12 7/8 x 39 3/4 x 8 3/4 (327 x 1009 x 223)
	Weight (Net/Ship) - lbs (kg)	24.49/30.56 (11.1/13.85)	24.49/30.56 (11.1/13.85)	29.57/36.63 (13.4/16.6)
	Factory-Installed Refrigerant Detection Sensor (RDS)	No	No	No
	Refrigerant Detection Sensor (RDS) Compatible	Yes (UALS01A, sold seperately)	Yes (UALS01A, sold separately)	Yes (UALS01A, sold separately)
	WiFi*	Built-in	Built-in	Built-in
Refrigerant Lines	Refrigerant	R454B	R454B	R454B
	Connections	Flare	Flare	Flare
	Liquid O.D. in	1/4	1/4	1/4
	Suction O.D. in	3/8	3/8	1/2
	Factory Charge Oz	46.6	50.1	58.6
	Maximum Line Length Ft / m	66/20	66/20	83/25
	Maximum Height Ft / m	33/10	33/10	50/15

*WiFi includes SmartHQ™ Home and SmartHQ™ Service compatibility.

SPECIFICATIONS

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	Outdoor Unit	1G09ED2BEA	1G12ED2BEA	1G18ED2BEA
	Indoor Unit	**US09CB2BEA**	**US12CB2BEA**	**US18CB2BEA**
	Panel (required, sold separately)	QACCP01WA	QACCP01WA	QACCP01WA
Cooling	Rated Capacity Btu/hr	9,000	12,000	18,000
	Capacity Range Btu/hr	3,000-10,000	3,000-13,000	6,000-19,000
	SEER2	20	20	20
	EER2	12	12	12
	Moisture Removal Pt./hr	2.40	3.50	5.50
Heating	Rated Heating Capacity 47°F Btu/hr	10,000	12,500	18,000
	Heating Capacity Range Btu/hr	3,000-11,000	3,000-14,000	6,000-19,500
	HSPF2 (IV)	10.0	10.0	10.0
	Rated Heating Capacity 5°F Btu/hr	9,000	10,000	14,400
	Heating Capacity at 5°F / Capacity at 47°F	90%	80%	80%
	COP 5°F	1.8	1.8	1.8
Operating Range	Cooling (Without Wind Baffle or Top Cover)	23~115°F (-5~46°C)	23~115°F (-5~46°C)	23~115°F (-5~46°C)
	Heating	-31~75°F (-35~24°C)	-31~75°F (-35~24°C)	-31~75°F (-35~24°C)
Power Supply	Voltage, Cycle, Phase (V/Hz/-)	208-230/60/1	208-230/60/1	208-230/60/1
	Maximum Fuse Size A	20	20	30
	Minimum Circuit Amp A	13	14	20
Outdoor Unit	Compressor Type	DC Inverter Rotary	DC Inverter Rotary	DC Inverter Rotary
	Outdoor Noise Level dB	54	55	60
	Dimension: H x W x D in (mm)	25 1/4 x 35 3/8 x 12 (642 x 898 x 306)	25 1/4 x 35 3/8 x 12 (642 x 898 x 306)	27 3/4 x 38 3/8 x 13 3/8 (705 x 974 x 340)
	Weight (Net/Ship) - lbs (kg)	83.41/96.87 (37.8/43.9)	88.15/100.4 (39.95/45.5)	104.59/122.46 (47.4/55.5)
	Basepan Heater	Yes	Yes	Yes
Indoor Unit	Fan Speed Stages	5 + Auto	5 + Auto	5 + Auto
	Airflow CFM: Cooling (Turbo/High/Med/Low/Quiet)	440/387/351/320/290	440/387/351/320/290	458/425/387/345/302
	Airflow CFM: Heating (Turbo/High/Med/Low/Quiet)	440/387/351/320/290	440/387/351/320/290	479/441/387/345/302
	Indoor Sound Level dB: Cooling (Turbo/High/Med/Low/Quiet)	42/40/36/32/25	45/42/40/36/32	45/42/40/36/32
	Indoor Sound Level dB: Heating (Turbo/High/Med/Low/Quiet)	42/40/36/32/25	45/42/40/36/32	45/42/40/36/32
	Auto Up-Down Louver	Yes	Yes	Yes
	Auto Left-Right Louver	No	No	No
	Dimension: H x W x D in (mm)	10 1/4 x 22 3/4 x 22 3/4 (260 x 575 x 575)	10 1/4 x 22 3/4 x 22 3/4 (260 x 575 x 575)	10 1/4 x 22 3/4 x 22 3/4 (260 x 575 x 575)
	Weight (Net/Ship) - lbs (kg)	32.41/47.4 (14.7/21.5)	32.41/47.4 (14.7/21.5)	32.41/47.4 (14.7/21.5)
	Drain Pipe Size O.D in	1*	1*	1*
	Condensate Pump	Built-In	Built-In	Built-In
	Max. Drain-Lift Height in (mm)	47 1/4 (1200)	47 1/4 (1200)	47 1/4 (1200)
	Factory-Installed Refrigerant Detection Sensor (RDS)	No	No	No
	Refrigerant Detection Sensor (RDS) Compatible	Yes (UALS01A, sold separately)	Yes (UALS01A, sold separately)	Yes (UALS01A, sold separately)
	WiFi**	Built-in	Built-in	Built-in
Refrigerant Lines	Refrigerant	R454B	R454B	R454B
	Connections	Flare	Flare	Flare
	Liquid O.D. in	1/4	1/4	1/4
	Suction O.D. in	3/8	3/8	1/2
	Factory Charge Oz	46.6	50.1	58.6
	Maximum Line Length Ft / m	66/20	66/20	83/25
	Maximum Height Ft / m	33/10	33/10	50/15

*Condensate drain adapter shipped with the indoor unit is designed to accept a 3/4" PVC pipe.

**WiFi includes SmartHQ™ Home and SmartHQ™ Service compatibility.

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	Outdoor Unit	1G09ED2BEA	1G12ED2BEA	1G18ED2BEA
	Indoor Unit	**US09FB2BEA**	**US12FB2BEA**	**US18FB2BEA**
Cooling	Rated Capacity Btu/hr	9,000	12,000	17,000
	Capacity Range Btu/hr	3,000-10,000	3,000-13,500	6,000-18,500
	SEER2	20	20	19
	EER2	12	12	9
	Moisture Removal Pt./hr	2.16	3.40	3.80
Heating	Rated Heating Capacity 47°F Btu/hr	10,000	12,300	18,000
	Heating Capacity Range Btu/hr	2,500-10,000	2,500-13,000	6,000-19,000
	HSPF2 (IV)	10.5	9.5	9.5
	Rated Heating Capacity 5°F Btu/hr	9,000	10,000	14,400
	Heating Capacity at 5°F / Capacity at 47°F	90%	81%	80%
	COP 5°F	1.8	1.8	1.8
Operating Range	Cooling (Without Wind Baffle or Top Cover)	23~115°F (-5~46°C)	23~115°F (-5~46°C)	23~115°F (-5~46°C)
	Heating	-31~75°F (-35~24°C)	-31~75°F (-35~24°C)	-31~75°F (-35~24°C)
Power Supply	Voltage, Cycle, Phase (V/Hz/-)	208-230/60/1	208-230/60/1	208-230/60/1
	Maximum Fuse Size A	20	20	30
	Minimum Circuit Amp A	13	14	20
Outdoor Unit	Compressor Type	DC Inverter Rotary	DC Inverter Rotary	DC Inverter Rotary
	Outdoor Noise Level dB	54	55	60
	Dimension: H x W x D in (mm)	25 1/4 x 35 3/8 x 12 (642 x 898 x 306)	25 1/4 x 35 3/8 x 12 (642 x 898 x 306)	27 3/4 x 38 3/8 x 13 3/8 (705 x 974 x 340)
	Weight (Net/Ship) - lbs (kg)	83.41/96.87 (37.8/43.9)	88.15/100.4 (39.95/45.5)	104.59/122.46 (47.4/55.5)
	Basepan Heater	Yes	Yes	Yes
Indoor Unit	Fan Speed Stages	5 + Auto	5 + Auto	5 + Auto
	Airflow CFM: Cooling (Turbo/High/Med/Low/Quiet)	290/218/205/176/147	314/226/210/195/175	345/341/271/218/210
	Airflow CFM: Heating (Turbo/High/Med/Low/Quiet)	312/206/205/176/147	311/223/200/195/175	328/296/263/206/200
	Indoor Sound Level dB: Cooling (Turbo/High/Med/Low/Quiet)	44/40/37/32/24	47/41/37/33/25	49/44/43/40/37
	Indoor Sound Level dB: Heating (Turbo/High/Med/Low/Quiet)	43/37/32/27/20	47/40/37/33/25	49/43/43/37/37
	Auto Up-Down Louver	Yes	Yes	Yes
	Auto Left-Right Louver	No	No	No
	Drain Pipe Size O.D in	5/8	5/8	5/8
	Dimension: H x W x D in (mm)	23 5/8 x 27 1/2 x 8 3/4 (600 x 700 x 220)	23 5/8 x 27 1/2 x 8 3/4 (600 x 700 x 220)	23 5/8 x 27 1/2 x 8 3/4 (600 x 700 x 220)
	Weight (Net/Ship) - lbs (kg)	32.41/43.43 (14.7/19.7)	32.41/43.43 (14.7/19.7)	32.41/43.43 (14.7/19.7)
	Factory-Installed Refrigerant Detection Sensor (RDS)	Yes	Yes	Yes
	WiFi*	Built-in	Built-in	Built-in
Refrigerant Lines	Refrigerant	R454B	R454B	R454B
	Connections	Flare	Flare	Flare
	Liquid O.D. in	1/4	1/4	1/4
	Suction O.D. in	3/8	3/8	1/2
	Factory Charge Oz	46.6	50.1	58.6
	Maximum Line Length Ft / m	66/20	66/20	83/25
	Maximum Height Ft / m	33/10	33/10	50/15

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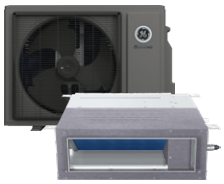


	Outdoor Unit	1G09ED2BEA	1G12ED2BEA	1G18ED2BEA
	Indoor Unit	US09MB2BEA	US12MB2BEA	US18MB2BEA
Cooling	Rated Capacity Btu/hr	9,000	10,000	18,000
	Capacity Range Btu/hr	3,000-10,000	3,000-11,000	6,000-19,000
	SEER2	19.6	19.8	18
	EER2	12	11.7	11.7
	Moisture Removal Pt./hr	1.10	1.18	3.80
Heating	Rated Heating Capacity 47°F Btu/hr	10,000	14,000	20,000
	Heating Capacity Range Btu/hr	3,000-12,500	3,000-14,500	6,000-20,500
	HSPF2 (IV)	10.5	10.5	10.5
	Rated Heating Capacity 5°F Btu/hr	8,000	10,000	17,000
	Heating Capacity at 5°F / Capacity at 47°F	80%	71%	85%
	COP 5°F	1.8	1.8	1.8
Operating Range	Cooling (Without Wind Baffle or Top Cover)	23~115°F (-5~46°C)	23~115°F (-5~46°C)	23~115°F (-5~46°C)
	Heating	-31~75°F (-35~24°C)	-31~75°F (-35~24°C)	-31~75°F (-35~24°C)
Power Supply	Voltage, Cycle, Phase (V/Hz/-)	208-230/60/1	208-230/60/1	208-230/60/1
	Maximum Fuse Size A	20	20	30
	Minimum Circuit Amp A	13	14	20
Outdoor Unit	Compressor Type	DC Inverter Rotary	DC Inverter Rotary	DC Inverter Rotary
	Outdoor Noise Level dB	54	55	60
	Dimension: H x W x D in (mm)	25 1/4 x 35 3/8 x 12 (642 x 898 x 306)	25 1/4 x 35 3/8 x 12 (642 x 898 x 306)	27 3/4 x 38 3/8 x 13 3/8 (705 x 974 x 340)
	Weight (Net/Ship) - lbs (kg)	83.41/96.87 (37.8/43.9)	88.15/100.4 (39.95/45.5)	104.59/122.46 (47.4/55.5)
	Basepan Heater	Yes	Yes	Yes
Indoor Unit	Fan Speed Stages	5 + Auto	5 + Auto	5 + Auto
	Airflow CFM: Cooling (Turbo/High/Med/Low/Quiet)	353/286/200/150/141	409/350/308/158/148	620/517/332/214/203
	Airflow CFM: Heating (Turbo/High/Med/Low/Quiet)	358/292/208/155/145	412/355/311/163/152	627/523/337/217/205
	Indoor Sound Level dB: Cooling (Turbo/High/Med/Low/Quiet)	44/41/38/35/32	47/44/41/38/35	48/45/42/39/36
	Indoor Sound Level dB: Heating (Turbo/High/Med/Low/Quiet)	44/41/38/35/32	47/44/41/38/35	48/45/42/39/36
	Dimension: H x W x D in (mm)	9 3/4 x 31 3/4 x 27 1/2 (248 x 805 x 700)	9 3/4 x 31 3/4 x 27 1/2 (248 x 805 x 700)	9 3/4 x 47 1/2 x 27 1/2 (248 x 1207 x 700)
	Weight (Net/Ship) - lbs (kg)	62.17/86.86 (28.2/39.4)	62.17/86.86 (28.2/39.4)	87.74/123.46 (39.8/56)
	Drain Pipe Size O.D in	1*	1*	1*
	Max. External Static Pressure in.W.G (Pa)	0.6 (150)	0.6 (150)	0.6 (150)
	Condensate Pump	Built-in	Built-in	Built-in
	Max. Drain-lift height in (mm)	27 1/2 (700)	27 1/2 (700)	27 1/2 (700)
	Factory-Installed Refrigerant Detection Sensor (RDS)	Yes	Yes	Yes
	WiFi**	Built-in	Built-in	Built-in
Refrigerant Lines	Refrigerant	R454B	R454B	R454B
	Connections	Flare	Flare	Flare
	Liquid O.D. in	1/4	1/4	1/4
	Suction O.D. in	3/8	3/8	1/2
	Factory Charge Oz	46.6	50.1	58.6
	Maximum Line Length Ft / m	66/20	66/20	83/25
	Maximum Height Ft / m	33/10	33/10	50/15

*Condensate drain adapter shipped with the indoor unit is designed to accept a 3/4" PVC pipe.

**WiFi includes SmartHQ™ Home and SmartHQ™ Service compatibility.

Cooling Operation Mode

Overview

The temperature control range in cooling mode is 23°F to 115°F. The temperature set by the remote control and the indoor unit ambient temperature sensor will determine if a call for cooling is needed. If a call for operation is communicated from the indoor unit to the outdoor unit. The indoor unit louver will open using a stepper motor, and the indoor fan will operate at the speed last set. The outdoor unit will determine the position of the EEV and speed frequency of the compressor. There can be a delay of up to 3 minutes before the outdoor unit fan and compressor start.

The speed of the indoor fan can be controlled manually by the user or automatically by the system. The speed can be changed between LOW, MEDIUM, and HIGH.

The predetermined conditions for cool mode automatic fan speed control are follows:

Fan Speed	Ambient Indoor Air Temperature
Low	1.8°F and lower below setpoint
Medium	Between 1.7°F below setpoint and 5.3°F above setpoint
High	5.4°F and higher above setpoint

There will be a 3 minute delay when switching from high speed fan to low speed fan. There will be no delay when switching from low speed fan to high speed fan.

The outdoor unit temperature sensors: outdoor ambient, defrost, suction line, and compressor discharge, used in conjunction with the indoor temperature sensors, indoor ambient and coil, provide information to the outdoor control board to monitor the system and regulate the frequency of the compressor, the EEV, and outdoor fan speed, to achieve the desired room temperature.

When the call for cooling has been satisfied, the compressor will turn off, followed by the outdoor fan. The indoor unit fan will continue to run. If the system detects a malfunction, it may shut down or show an error code. This code will be shown on the indoor display board or a flashing LED will appear on the outdoor PCB.

Indoor Unit

To enter the cool mode, point the infrared remote control at the indoor unit and press the power button, then press the COOL mode button if not already set to cool mode. The signals received by the infrared receiver are relayed to the main board of the indoor unit to turn the system on and set it to cool mode. The indoor unit PCB will illuminate the display, indicating the set temperature and current status of the unit. The PCB will signal the stepper motor to open the louver to either a stationary position, or one of several oscillating modes.

As the louver opens, the indoor unit main board will power up the indoor fan motor, operating the fan at the speed last set. The indoor fan motor has a feedback circuit which provides the indoor unit main board with information for controlling the speed of the fan motor.

Temperature Sensors

The indoor unit has two sensors that provide temperature information to the main board. The sensors: an indoor ambient temperature sensor, and pipe temperature sensor, are used for controlling the system during cool mode. The resistance values of the sensors will vary with temperature. The resistance to temperature values can be found to the sensor being checked.

Communication

The indoor and outdoor unit main boards communicate via a digital signal on the wire connected to terminal 3 of each unit. A splice or break in this wire will cause a communication error. When a command is received from the remote control, the indoor unit main board communicates with the outdoor unit main board to perform the requested function.

Outdoor Unit

Upon a request for cooling, the outdoor unit main board applies power to the outdoor fan motor and compressor. Depending on system cycling, there may be up to a 3 minute wait period before the compressor and outdoor fan start. WARNING: Do not measure compressor voltages as damage to the meter may result.

Temperature Sensors

Four temperature sensors located in the outdoor unit provide temperature information to the outdoor unit main board for control of the system during cool mode.

The outdoor ambient temperature sensor provides the temperature of the air drawn into the condenser coil.

The defrost temperature sensor provides the temperature sensed at the output of the condenser coil.

The suction line temperature sensor provides the temperature sensed at the incoming suction line pipe.

The compressor discharge sensor provides the temperature sensed at the discharge pipe of the compressor.

Call to Terminate Cooling

The system will terminate cooling when the indoor ambient temperature sensor is equal to or lower than 2°F of the room set temperature. The indoor control board will communicate to the outdoor control board to de-energize the compressor.

The outdoor fan will run for 60 seconds before stopping. The indoor fan motor and louver will continue operating after cooling has been terminated.

To stop cool mode, press the power button to turn the system off, or change to another mode.

Freeze Protection Function

When the compressor operates continuously for 10 seconds and the temperature of the indoor coil has been below 35.6°F for 10 seconds, the compressor will stop. The indoor unit fan will continue to operate.

When the temperature of the indoor coil rises to 50°F for more than 3 minutes the compressor will restart and the system will continue functioning.

Heating Operation Mode

Overview

The temperature control range in heating mode is -4°F to 75°F. The temperature set by the remote control and the indoor unit ambient temperature sensor will determine if a call for heat is needed. If a call for heat is justified, a temperature compensation adjustment is automatically added to the operating parameter and the call is communicated from the indoor unit to the outdoor unit.

The indoor unit louver will open using a stepper motor. The indoor fan will not operate at this time.

The outdoor unit will shift the 4-way valve to the heat mode position and determine the position of the EEV and speed (frequency) of the compressor. There can be a delay of up to 3 minutes before the outdoor unit fan and compressor start.

The predetermined conditions for automatic control are follows:

Note: The heating mode has a temperature compensation of 4 °C, resulting in the actual ambient temperature being subtracted from the calculation by approximately 7 °F.

As the indoor ambient temperature falls, the change of fan speed follows the following temperature conditions:

Fan Speed	Ambient Indoor Air Temperature
Stop	8.8°F and higher above setpoint
Low	Between 5.9°F and 8.7°F above setpoint
Medium	Between 3.6°F and 5.8°F above setpoint
High	Below setpoint and up to 3.5°F above setpoint

There will be a 3 minutes delay when switching from high speed fan to low speed fan. There will be no delay when switching from low speed fan to high speed fan.

Cold Air Proof Operation

At initial start of heat mode, indoor blower will not be turned on immediately until indoor coil temperature senses a minimum temperature. This prevents cold air from being blown until the coil is heated.

The indoor fan is controlled based on the coil temperature, as shown in the figure above.

When the coil temperature rises, the fan speed is judged according to the coil temperature:

1. At the end of heating or defrosting after the first power on, the fan stops when the coil temperature is lower than 25°C/ 77°F;
2. Coil temperature between 25°C/ 77°F and 35°C/ 96°F fan speed is weak;
3. Coil temperature between 35°C/ 96°F and 37°C/ 100°F fan speed is weak;
4. Coil temperature is higher than 37°C/ 100°F, fan speed according to the set operation.
5. When the coil temperature drops, the fan speed is judged according to the hot cross temperature:
    - Coil temperature is higher than 35°C, fan speed according to the set operation.
    - Coil temperature between 37°C and 35°C fan speed is mid
    - Coil temperature between 35°C and 25°C fan speed is low
    - Coil temperature between 25°C and 23°C fan speed is weak
    - The fan stops when the coil temperature is lower than 23°C

Residual heat sending: the indoor fan will operate on low speed until the coil temperature reaches 73°F or stop after 50 seconds.

The outdoor unit temperature sensors: outdoor ambient, defrost, suction line, and compressor discharge, used in conjunction with the indoor coil and room temperature sensors, provide information to the outdoor control board to monitor the system and regulate the speed of the compressor, the EEV and outdoor fan speed to achieve the desired room temperature.

When heating has been satisfied, the compressor will turn off first, followed by the outdoor fan. The 4-way valve will de-energize 2 minutes after compressor stops.

To save energy, The indoor unit fan will continue to run at minimum speed until indoor coil temperature reaches a minimum temperature, when it will turn off.

If the system detects a malfunction, it may shut down or show an error code on the indoor unit display board and/or l outdoor unit main board LED.

Defrost

When the system initiates a call for defrost, the indoor fan motor stops. The indoor unit display will not change. Any indoor unit malfunctions will be ignored at this time. The system will cycle through the defrost operation. Any indoor unit malfunctions will be ignored until the compressor restarts and has been operating for 30 seconds. At the conclusion of the defrost cycle, the indoor fan will enter the cold air proof operation. Heat mode resumes.

Automatic Heating Temperature Compensation

When the system is in heating mode, a temperature compensation adjustment is added to the sensed temperature. This is intended to adapt for temperature stratification in the conditioned environment relative to the installation location of the indoor head.

Indoor Unit

To enter the heat mode, point the infrared remote controller at the indoor unit and press the power button, then press the HEAT mode button if not already set to heat mode.

The signals received by the infrared receiver are relayed to the main board of the indoor unit to turn the system on and set it to heat mode.

The indoor unit PCB will activate the display of the indoor unit, illuminating the display and indicating the set temperature and current status of the unit.

The indoor unit PCB will signal the stepper motor to open the louver to a stationary position.

The PCB will power up the indoor fan motor after the outdoor unit has started and heating of the indoor coil has taken place (see cold air proof operation). The motor has a feed-back circuit which provides information for controlling the speed of the fan motor.

Temperature Sensors

The indoor unit has two sensors that provide temperature information to the indoor unit main board. The sensors: a room temperature sensor, and pipe temperature sensor, are used for controlling the system during heat mode.

The resistance values of the sensors will vary with temperature. The resistance to temperature values can be found using a temperature/ resistance chart specific to the sensor being checked.

Communication

The indoor and outdoor unit main boards communicate via a digital signal on the wire connected to terminal 3 of each unit. A splice or break in this wire will cause a communication error.

When a command is received from the remote control, the indoor unit main board communicates with the outdoor unit to perform the requested function.

Outdoor Unit

Upon a request for heat, the outdoor unit main board applies power to the fan motor and compressor. Depending on system cycling, there may be up to a 3 minute wait period before the compressor and outdoor fan start.

WARNING: Do not measure compressor voltages, damage to the meter may result.

If the room temperature is above the set temperature, yet lower than 2° F above the set temperature, the system will adjust the running frequency of the compressor automatically.

The outdoor unit PCB also controls the position of the EEV (Electronic Expansion Valve} to regulate the flow of refrigerant to the indoor unit evaporator coil.

Temperature Sensors

Four temperature sensors located in the outdoor unit provide information to the outdoor unit PCB for control of the system during dry mode.

The outdoor ambient temperature sensor provides the temperature of the air drawn into the condenser coil.

The defrost temperature sensor provides the temperature sensed at the output of the condenser coil.

The suction line temperature sensor provides the temperature sensed at the incoming suction line pipe.

The compressor discharge sensor provides the temperature sensed at the discharge pipe of the compressor.

Call to Terminate Heating

The system will call to terminate heating when the indoor temperature is equal to or higher than 2°F above the room set temperature. The indoor control board will communicate to the outdoor control board to de- energize the compressor. The outdoor fan will run for 60 seconds before stopping. The 4-way valve will de-energize 2 minutes after the compressor stops.

To stop heat mode, press the power button to turn the system off, or change to another mode.

Auto Mode

With the system turned on, press the AUTO button on the remote control. The system will change to the auto mode of operation.

As the room is cooled or heated, the system will automatically switch between cool mode, fan mode, and heat mode. There is a minimum 15 minute operating time between mode changes.

Dry Mode

Overview

To enter the dry mode, point the infrared remote control at the indoor unit and press the power button, then press the DRY mode button if not already set to dry mode.

The signals received by the infrared receiver are relayed to the main board of the indoor unit to turn the system on and set it to dry mode.

The indoor unit main board will illuminate the display, indicating the set temperature and current status of the unit.

The PCB will then signal the louver stepper motor to open the louver to either a stationary position, or one of several oscillating modes.

As the louver opens, the indoor fan motor will operate at the speed last set. The fan motor has a feedback circuit which provides the main board with information for controlling the speed of the fan motor.

NOTE: It is recommended that Dry mode is not used for longer than a 4-hour period to minimize overflowing the condensate drain pipe.

The temperature control range is 60°F - 86°F. This mode is used for dehumidification.

Tr= room temperature Ts= set temperature

When Tr > Ts+ 4°F, the compressor will turn on and the indoor fan will operate at the set speed.

When Ts ≤ Tr ≤ Ts+ 4°F, the compressor will operate at the high dry frequency for 10 minutes, then at the low dry mode for 6 minutes. The indoor fan will operate at low speed.

When Tr< Ts, the outdoor unit will stop, and the indoor fan will stop for 3 minutes, then operate at the low speed option.

Automatic fan speed:

- When Tr > Ts+ 9°F, High speed
- When Ts+ 5.4°F ≤ Tr< Ts+ 9°F, Medium speed
- When Ts+ 3.6°F ≤ Tr< Ts+ 5.4°F, Low speed
- When Tr< Ts+ 3.6°F, Light speed

Note: TURBO and QUIET mode must be set using the remote controller.

If the outdoor fan is stopped, the indoor fan will pause for 3 minutes.

If the outdoor fan is stopped for more than 3 minutes, and the compressor is still operating, the system will change to light speed mode.

Temperature Sensors

The indoor unit has two sensors that provide temperature information to the PCB. An ambient temperature sensor and pipe temperature sensor are used for controlling the system during dry mode. The resistance values of the sensors will vary with temperature. The resistance to temperature values can be found using a temperature /resistance chart specific to the sensor being checked.

Communication

The indoor and outdoor unit main boards communicate via a digital signal on the wire connected to terminal 3 of each unit. A splice or break in this wire will cause a communication error.

When a command is received from the remote control, the indoor unit main board communicates with the outdoor unit main board via the terminal 3 wire to perform the requested function.

Outdoor Unit

Upon a request for dry mode, the outdoor unit main board applies power to the fan motor and compressor. Depending on system cycling, there may be up to a 3 minute wait period before the compressor and outdoor fan start.

WARNING: Do not measure compressor voltages, damage to the meter may result.

The outdoor unit PCB also controls the position of the EEV (Electronic Expansion Valve} to regulate the flow of refrigerant to the indoor unit evaporator coil.

Temperature Sensors

Four temperature sensors located in the outdoor unit provide information to the outdoor unit PCB for control of the system during dry mode.

The outdoor ambient temperature sensor provides the temperature of the air drawn into the condenser coil.

The defrost temperature sensor provides the temperature sensed at the output of the condenser coil.

The suction line temperature sensor provides the temperature sensed at the incoming suction line pipe.

The compressor discharge sensor provides the temperature sensed at the discharge pipe of the compressor.

To stop dry mode, press the power button to turn the system off, or change to another mode.

Defrost Operation

To enter the defrost mode, the compressor must have accumulated 10 minutes of run time, and 45 minutes of accumulated run time since the last defrost cycle.

When the defrost cycle begins, the following conditions take place:

1. Indoor fan motor stops.
2. Compressor stops for 40 seconds.
3. After 40 seconds, the 4-way valve shifts to cooling position and outdoor fan stops. Compressor start again.
4. About 1 minute, the compressor accelerates to the defrost frequency.
5. The outdoor unit will now defrost. Defrost cycle runs continuously for approximately 10 minutes, unless the condenser maintains a temperature above 48°F for 60 seconds, or the condenser maintains a temperature above 59°F for 5 seconds.

Upon exiting the defrost cycle, the following conditions will take place:

1. The compressor will stop.
2. The outdoor fan will operate at high speed.
3. 25 seconds later the 4-way valve will shift to the heating mode.
4. 30 seconds later the compressor will start, and the system resumes normal operation.

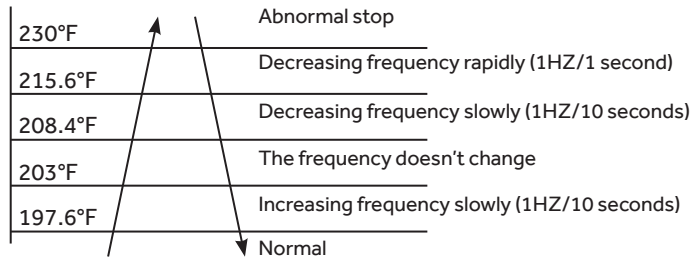
Protection Functions

These functions limit the operation of the system when encountering the normal operating limits of the equipment.

Compressor High Temperature

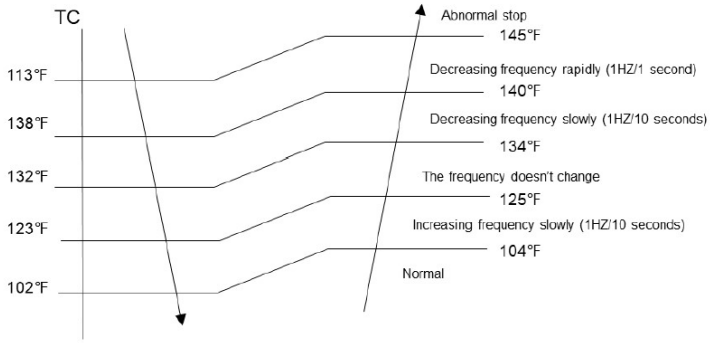
The compressor discharge pipe sensor (exhaust temp) senses the temperature of the refrigerant exiting the compressor The sensed temperature received from the sensor by the control circuitry will cause the compressor frequency to increase or decrease (see chart below) If a temperature of >= 230 °F is sensed for 2 seconds, an exhaust overheating protection error code will be indicated at the outdoor unit.

TTC



Overheating Protection for Indoor Unit

A sensor monitors coil temperature in both heating and cooling modes, and causes the compressor to speed up, slow down, or stop



Compressor Over-Current Protection

If the current draw of the compressor at startup is greater than the values listed on the chart below for approximately 5 seconds, the compressor will stop. After 3 minutes the compressor will restart. If the over-current condition occurs 3 times in 20 minutes, the system will lock-out, and a code will be indicated at the outdoor unit. It will be necessary to remove power to the system to reset the lock-out condition.

Model	Cooling Increase Point	Cooling Decrease Point	Heating Increase Point	Heating Decrease Point	Stop Point
09K	5.5A	6.5A	7A	8A	10.5A
12K	5.5A	6.5A	7A	8A	10.5A
18K	12A	12A	13A	13A	14A

Compressor frequencies:

Model	Cooling	Heating
09K	20-66 Hz	20-118 Hz
12K	12-66 Hz	12-110 Hz
18K	12-49 Hz	13-106 Hz

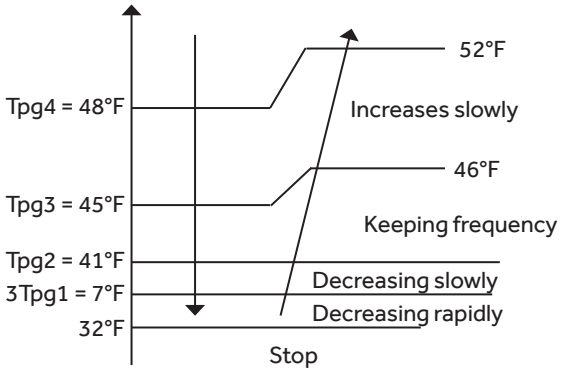
Indoor Coil Anti-Freeze Protection

The temperature sensed by the coil sensor is used to determine at what speed the compressor is to run to avoid the coil temperature being too cold.

TCI_Indoor: Indoor unit pipe sensor temperature
tS: Outdoor unit Suction Line sensor temperature

- When Min(TCI_indoor, (TCI_indoor + tS)/2) < TCI1, the frequency of the compressor decreases at the rate of 1HZ / 1 second.
- When Min(TCI_indoor, (TCI_indoor + tS)/2) < TCI2, the frequency of the compressor decreases at the rate of 1HZ / 10 second.
- When TCI_indoor begins to rise again, and TCI2 ≤ Min(TCI_indoor, (TCI_indoor + tS)/2) ≤ TCI3, the frequency of the compressor does not change.
- When TCI3 < Min(TCI_indoor, (TCI_indoor + tS)/2) < TCI4, the frequency of the compressor increases at the rate of 1HZ / 10 second.

Example: if Min(TCI_indoor, TCI_indoor + tS)/2) ≤ 32°F sustains for 2 minutes, the outdoor unit will stop and indicate an underload malfunction code at the outdoor unit. The compressor stops for a minimum of 3 minutes. When Min(TCI_indoor, TCI_indoor + tS)/2) > TCI4, the compressor will restart.



Base Pan Heater

To keep condensate water from freezing inside the cabinet, a base pan heater is installed at the factory.

Operation condition:

a. It will start while defrosting process is running.

b. If AC is not in defrost process, it will work refer to the chart below for the operating parameters.

Outdoor Temperature	Pan Heater
> 37°F (3°C)	OFF
28°F (-2°C) to 34°F (1°C)	OFF 20min, ON 10min
10°F (-12°C) to 25°F (-4°C)	OFF 15min, ON 15min
< 10°F (-12°C)	ON

Special Functions

Auto Restart

When this is enabled, the following functions will automatically resumes after a power loss:

- ON/OFF State, Mode of Operation, Fan Speed, Temperature Setpoint, Louver Swing settings.
- If there was a timer set , it will be canceled upon restart.

Enable auto restart:

Press sleep Button 10 times within 7 seconds. Unit will beep 4 times to confirm.

Disable auto restart:

Press sleep Button 10 times within 7 seconds. Unit will beep 2 times to confirm.

Wired controller can control the function by dip switch SW1-4: off is enable, on is disable.

Enhanced/Timed Defrost

via Remote Controller

Setting method:

1. Set to HEAT Mode
2. Set to 30°C/86°F
3. Set High Fan Speed
4. Press Temperature+ Button 10 times within 7 seconds
5. Unit will Beep 7 times to Confirm.

Cancel method:

Same process as Setting Method. Hear Unit Beep 5 times to confirm of cancel function.

Indoor Temperature Display

This function will allow you to set the display to show either the Ambient temperature or the setpoint:

Set temperature:

- Press the Light button 10 times within 5 second. Unit will Beep 4 times to confirm.

Ambient temperature:

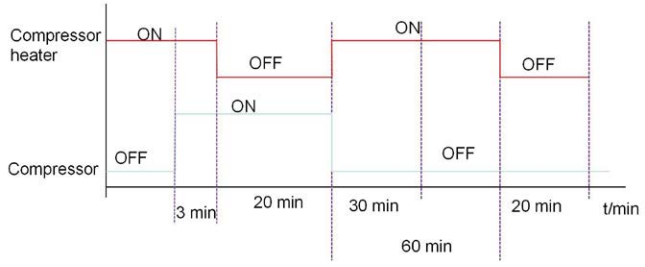
- Press the Light button 10 times within 5 second. Unit will Beep 2 times to confirm.

Crankcase (Compressor) Heater

Operation logic:

a. If outdoor ambient temperature is 5°C, compressor heater is OFF.

b. If outdoor ambient temperature is <3°C, compressor heater functions as shown:



Temperature Compensation

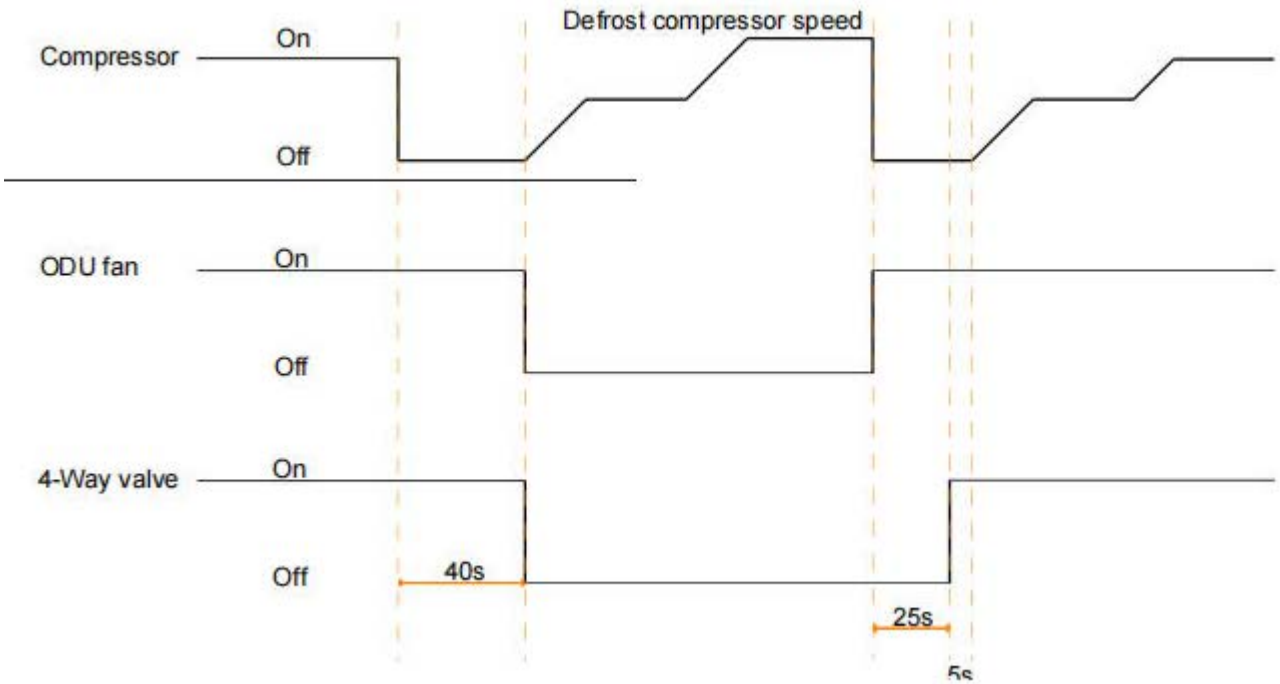
Set Temperature:

1. Apply power to the unit.
2. Set to Cooling Mode or Heating Mode
3. Set the temperature to 24°C.
4. Press the SLEEP button 7 times within 5 seconds. Indoor PCB will beep 2 times to confirm.
5. 24°C will be the starting/reference point for the Temperature Compensation.
6. Press ▲ or ▼ on the controller to adjust compensation temperature value. Temperature Compensation can be adjusted from -8°C to +6 °C. (Example: if you want to set the Temperature Compensation value by 4°C, then set the temperature to 28°C.)
7. Once the desired value has been selected, turn OFF the unit to save the compensation settings.

Timed Defrost

Logic:

1. After receiving the defrost signal, the compressor will stop.
2. 40 seconds later, the four-way valve is reversed and the outdoor fan stops.
3. The compressor gradually increases frequency to the highest defrosting frequency.
4. After defrosting completes, the outdoor fan motor starts, the compressor stops, and the four-way valve is opened after 25 seconds
5. The compressor will start after 5 seconds.



1G09ED2BEA
1G12ED2BEA
1G18ED2BEA

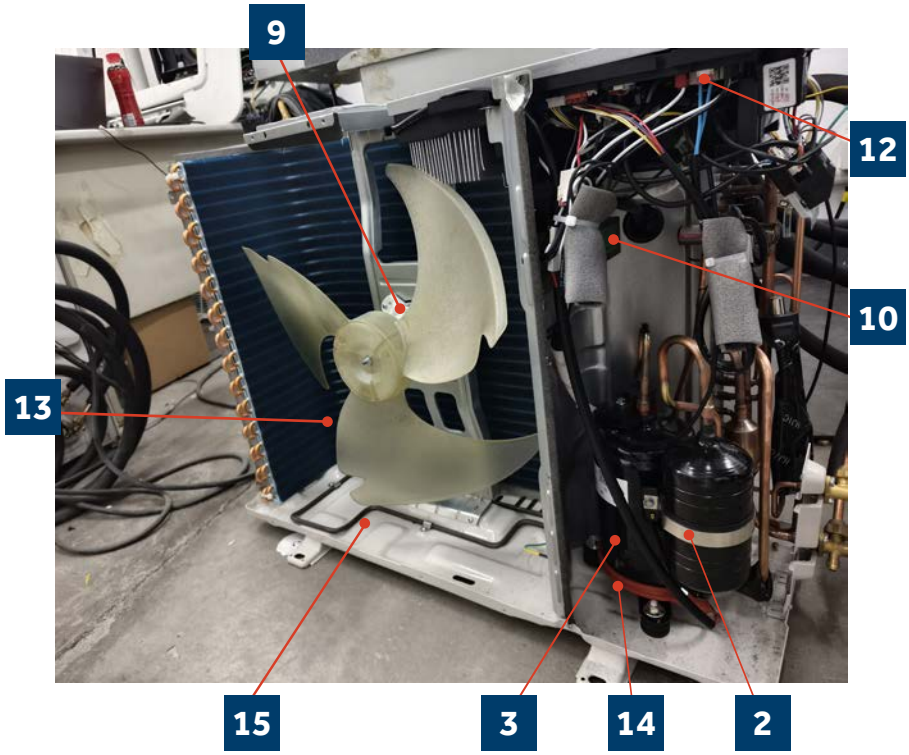
TABLE OF CONTENTS

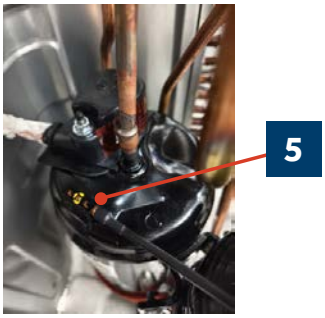
COMPONENTS

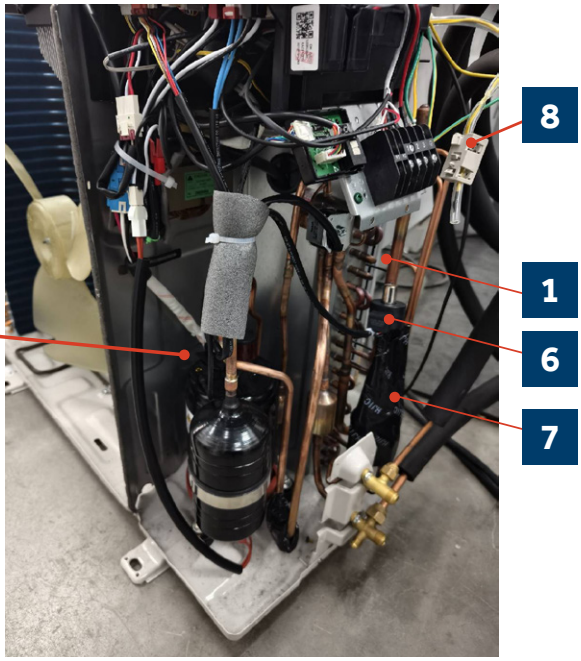
The outdoor unit has a PCB that integrates the control functions and power functions into one PCB. Sensors monitor key temperatures throughout the system to manage operational decisions.

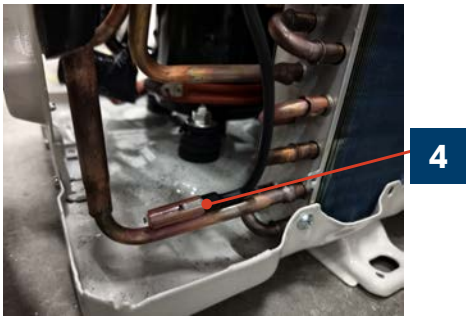
Outdoor Component Identification: 1G09ED2BEA

1. 4-Way Valve
2. Accumulator
3. Compressor
4. Defrost Temperature Sensor
5. Discharge Temperature Sensor
6. Electronic Expansion Valve
7. Refrigerant Strainers
8. Ambient Temperature Sensor
9. Fan Motor
10. Power Factor Reactor
11. Terminal Block
12. Power Control Board (PCB)
13. Fan Blade
14. Compressor Heater
15. Base Pan Heater

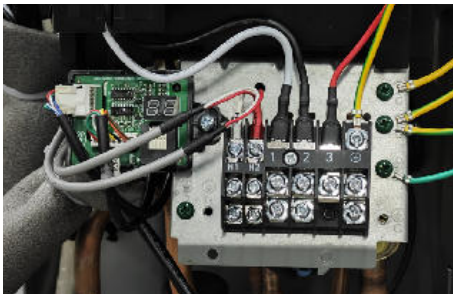








Terminal Block



The outdoor unit is powered by 208/230 volt single phase electricity connected at the terminal block.

Terminals 1 and 2 connect this voltage to the system. H1 and H2 is used for OTA .

The number 3 terminal is communication that connects wiring between the indoor and outdoor units. A ground terminal connects the outdoor unit to the line voltage power source.

The indoor unit is also powered by the same electrical supply as the outdoor unit. Only AWG 14-4 stranded copper wire is allowed connected to the Terminal Block block at the outdoor unit and is run to the same terminals on the indoor terminal block.

When installing the field supplied wiring, make certain the wire gauge is correct. There should not be any electrical wiring splices between the indoor unit and outdoor unit wire connection 3. This wire is used to carry communication data between the indoor and outdoor units. A wiring splice where wires are twisted in a wire nut may cause deformation of the communication signal. If communication is lost between the indoor and outdoor units, an ERROR CODE E7 will occur.

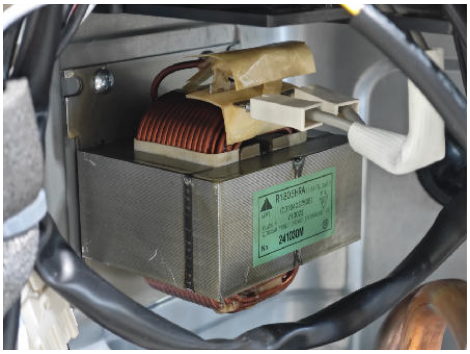
Compressor

The compressor is a three phase DC inverter driven rotary type, capable of variable speed operation. The compressor operating frequency will be determined by the temperature difference between set point and room temperature.

The compressor of all outdoor units is electrically connected to the IPM on terminal connections CN-7, CN-8 and CN-9.

Protection of the compressor will be provided by the discharge temperature sensor, the suction line temperature sensor, and the over current protection parameter in the PCB.

Power Factor Reactor



The Reactor is a power filter. It is unlikely to ever have an electrical failure of this component.

The Reactor of all outdoor units is electrically connected to the IPM on terminal connections CN-5 and CN-6 .

Fan Motor

The fan motor is a variable speed DC motor. The required speed is calculated by the PCB. The motor is electrically connected to the PCB via PLUG CN-10.

In COOL MODE, the motor will slow down as outdoor air temperature falls. In HEAT MODE, the motor will increase speed as the outdoor air temperature falls.

Temperature Sensors

These 3 sensors are part of an assembly and will all be changed together.

Discharge Temperature Sensor

The Discharge Temperature Sensor is a negative coefficient thermistor that senses the temperature of the compressor hot gas. The PCB monitors the temperature of the compressor hot gas and will make inverter speed changes in response to input from this device.

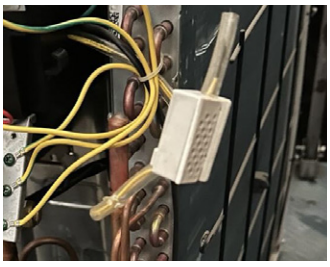
This sensor connects to the Power Control Board at PLUG CN-15

Defrost Temperature Sensor

The Defrost Temperature Sensor is a negative coefficient thermistor that will change resistance in response to outdoor coil temperature changes. The PCB monitors the temperature of the outdoor coil to determine when the system should perform a defrost cycle. The sensor also monitors coil temperature during defrost cycles to determine termination conditions.

This sensor connects to the Power Control Board at PLUG CN-15.

Outdoor Ambient Temperature Sensor



The Ambient Temperature Sensor is a negative coefficient thermistor that will change resistance in response to outdoor air temperature changes. The PCB monitors the temperature of the outdoor air to determine fan speed requirements and inverter speed. The sensor also plays a role in calculation of required defrost conditions.

This sensor connects to the Power Control Board at PLUG CN-15

4-Way Valve

The 4-Way Valve redirects the flow of refrigerant in the piping circuit to allow the system to reverse the functions of the indoor and outdoor coils. When de-energized in COOL MODE, the valve will direct the refrigerant hot gas to the outdoor coil. When energized in HEAT MODE, the valve will direct the hot gas to the indoor coil.

The valve flow direction capability is controlled by an electrical solenoid. When energized with 208/230 VAC, the solenoid will magnetically move an internal slide within the 4-Way Valve to change the direction of refrigerant flow.

The 4-Way Valve is electrically connected to the Power Control Board at PLUG CN-11.

Electronic Expansion Valve

The metering device is an electronic expansion valve. The valve consists of an electrical operator and a valve body with internal variable size orifice. When operating, the PCB will send pulses of voltage to the electrical operator. The operator will then magnetically move the position of the metering orifice pin to vary refrigerant flow.

The metering device position is determined by input from a Discharge Temperature Sensor. The EEV will change the internal orifice size to maintain an acceptable level of superheat.

During COOL MODE the valve meters low pressure refrigerant to the indoor coil. During HEAT MODE the valve meters low pressure refrigerant to the outdoor coil.

The electrical expansion valve is electrically connected to the Power Control Board at PLUG CN-16.

Accumulator

The Accumulator is located in the suction line circuit at the entrance to the compressor. The accumulator helps prevent liquid refrigerant from entering the compressor during run operation.

Refrigerant Strainers

The system has debris-catching strainers that protect internal system components from contaminants in the refrigerant. The strainer is a permanent part that is not typically replaced.

Compressor Heater

The Compressor heater is used to preheat the compressor and assist the start of the compressor at low temperature. The Compressor Heater is electrically connected to the Power Control Board at PLUG CN-13 and energized with 208/230 VAC.

Base Pan Heater

To keep condensate water from freezing inside the cabinet, a base pan heater is installed at the base pan. The Base Pan Heater is electrically connected to the Power Control Board at PLUG CN-12 and energized with 208/230 VAC.

The outdoor unit has a PCB that integrates the control functions and power functions into one PCB. Sensors monitor key temperatures throughout the system to manage operational decisions.

Outdoor Component Identification: 1G12ED2BEA

1. 4-Way Valve
2. Accumulator
3. Compressor
4. Defrost Temperature Sensor
5. Discharge Temperature Sensor
6. Electronic Expansion Valve
7. Refrigerant Strainers
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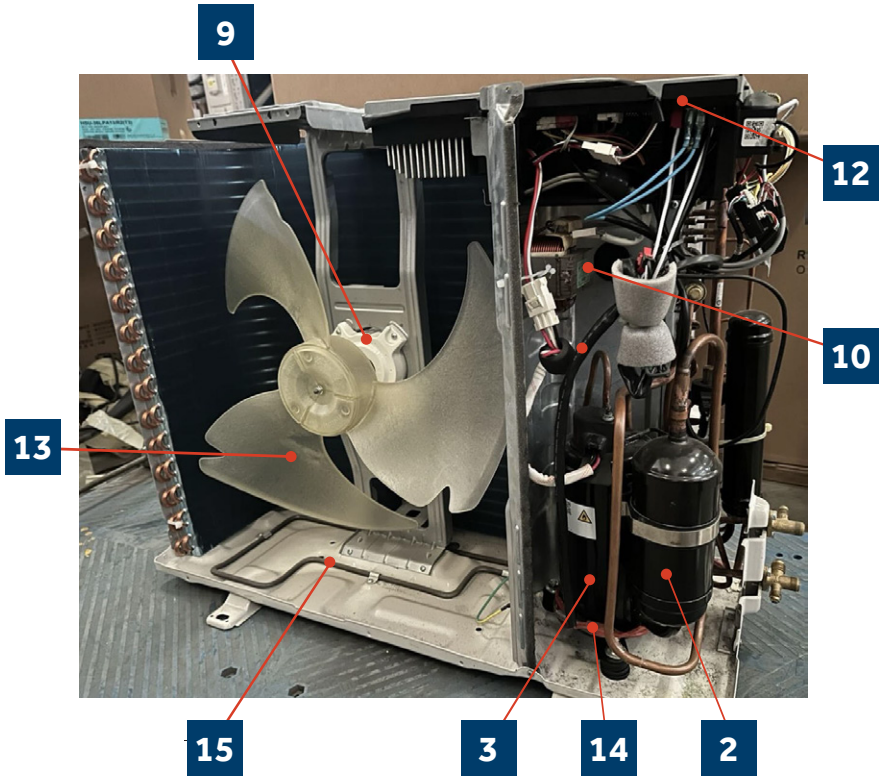
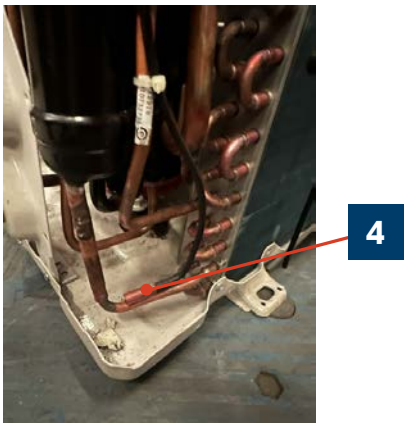
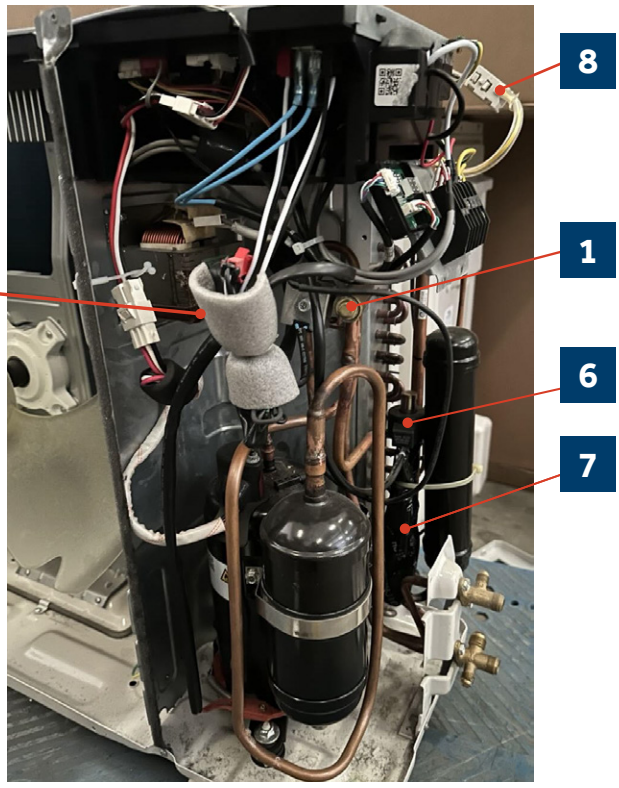
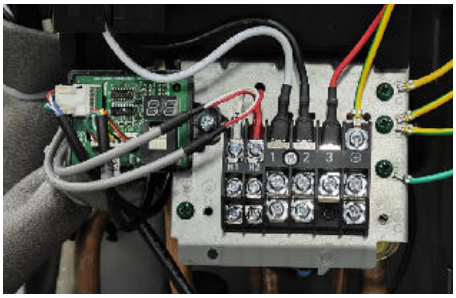






Terminal Block



The outdoor unit is powered by 208/230 volt single phase electricity connected at the terminal block.

Terminals 1 and 2 connect this voltage to the system.

The number 3 terminal is communication that connects wiring between the indoor and outdoor units. A ground terminal connects the outdoor unit to the line voltage power source.

The indoor unit is also powered by the same electrical supply as the outdoor unit. Only AWG 14-4 stranded copper wire is allowed connected to the Terminal Block block at the outdoor unit and is run to the same terminals on the indoor terminal block.

When installing the field supplied wiring, make certain the wire gauge is correct. There should not be any electrical wiring splices between the indoor unit and outdoor unit wire connection 3. This wire is used to carry communication data between the indoor and outdoor units. A wiring splice where wires are twisted in a wire nut may cause deformation of the communication signal. If communication is lost between the indoor and outdoor units, an ERROR CODE E7 will occur.

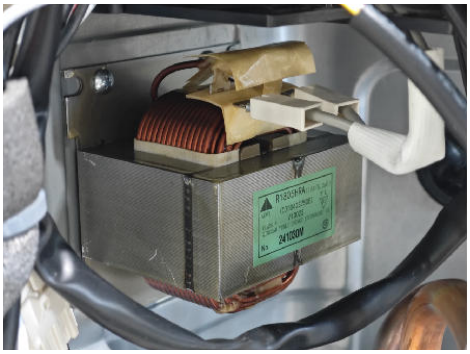
Compressor

The compressor is a three phase DC inverter driven rotary type, capable of variable speed operation. The compressor operating frequency will be determined by the temperature difference between set point and room temperature.

The compressor of all outdoor units is electrically connected to the IPM on terminal connections CN-7, CN-8 and CN-9.

Protection of the compressor will be provided by the discharge temperature sensor, the suction line temperature sensor, and the over current protection parameter in the PCB.

Power Factor Reactor



The Reactor is a power filter. It is unlikely to ever have an electrical failure of this component.

The Reactor of all outdoor units is electrically connected to the IPM on terminal connections CN-5 and CN-6.

Fan Motor

The fan motor is a variable speed DC motor. The required speed is calculated by the PCB. The motor is electrically connected to the PCB via PLUG CN-10.

In COOL MODE, the motor will slow down as outdoor air temperature falls. In HEAT MODE, the motor will increase speed as the outdoor air temperature falls.

Temperature Sensors

These 3 sensors are part of an assembly and will all be changed together.

Discharge Temperature Sensor

The Discharge Temperature Sensor is a negative coefficient thermistor that senses the temperature of the compressor hot gas. The PCB monitors the temperature of the compressor hot gas and will make inverter speed changes in response to input from this device.

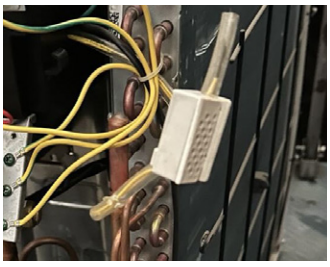
This sensor connects to the Power Control Board at PLUG CN-15

Defrost Temperature Sensor

The Defrost Temperature Sensor is a negative coefficient thermistor that will change resistance in response to outdoor coil temperature changes. The PCB monitors the temperature of the outdoor coil to determine when the system should perform a defrost cycle. The sensor also monitors coil temperature during defrost cycles to determine termination conditions.

This sensor connects to the Power Control Board at PLUG CN-15.

Outdoor Ambient Temperature Sensor



The Ambient Temperature Sensor is a negative coefficient thermistor that will change resistance in response to outdoor air temperature changes. The PCB monitors the temperature of the outdoor air to determine fan speed requirements and inverter speed. The sensor also plays a role in calculation of required defrost conditions.

This sensor connects to the Power Control Board at PLUG CN-15.

4-Way Valve

The 4-Way Valve redirects the flow of refrigerant in the piping circuit to allow the system to reverse the functions of the indoor and outdoor coils. When de-energized in COOL MODE, the valve will direct the refrigerant hot gas to the outdoor coil. When energized in HEAT MODE, the valve will direct the hot gas to the indoor coil.

The valve flow direction capability is controlled by an electrical solenoid. When energized with 208/230 VAC, the solenoid will magnetically move an internal slide within the 4-Way Valve to change the direction of refrigerant flow.

The 4-Way Valve is electrically connected to the Power Control Board at PLUG CN-11.

Electronic Expansion Valve

The metering device is an electronic expansion valve. The valve consists of an electrical operator and a valve body with internal variable size orifice. When operating, the PCB will send pulses of voltage to the electrical operator. The operator will then magnetically move the position of the metering orifice pin to vary refrigerant flow.

The metering device position is determined by input from a Discharge Temperature Sensor. The EEV will change the internal orifice size to maintain an acceptable level of superheat.

During COOL MODE the valve meters low pressure refrigerant to the indoor coil. During HEAT MODE the valve meters low pressure refrigerant to the outdoor coil.

The electrical expansion valve is electrically connected to the Power Control Board at PLUG CN-16.

Accumulator

The Accumulator is located in the suction line circuit at the entrance to the compressor. The accumulator helps prevent liquid refrigerant from entering the compressor during run operation.

Refrigerant Strainers

The system has debris-catching strainers that protect internal system components from contaminants in the refrigerant. The strainer is a permanent part that is not typically replaced.

Compressor Heater

The Compressor heater is used to preheat the compressor and assist the start of the compressor at low temperature. The Compressor Heater is electrically connected to the Power Control Board at PLUG CN-13 and energized with 208/230 VAC.

Base Pan Heater

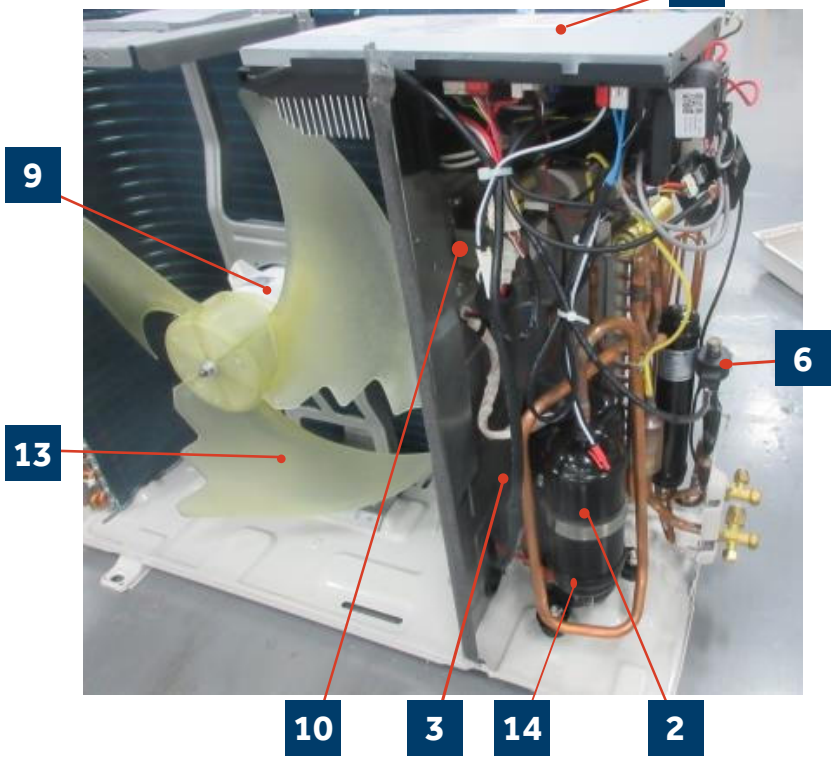
To keep condensate water from freezing inside the cabinet, a base pan heater is installed at the base pan. The Base Pan Heater is electrically connected to the Power Control Board at PLUG CN-12 and energized with 208/230 VAC.

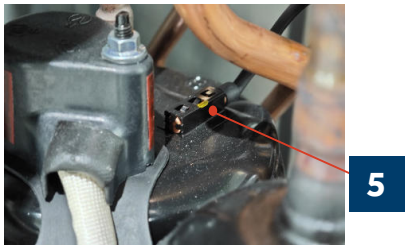
COMPONENTS

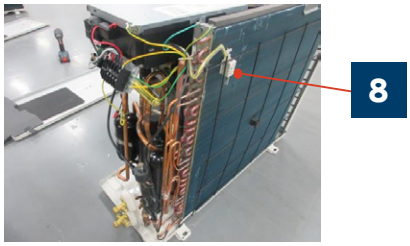
The outdoor unit has a PCB that integrates the control functions and power functions into one PCB. Sensors monitor key temperatures throughout the system to manage operational decisions.

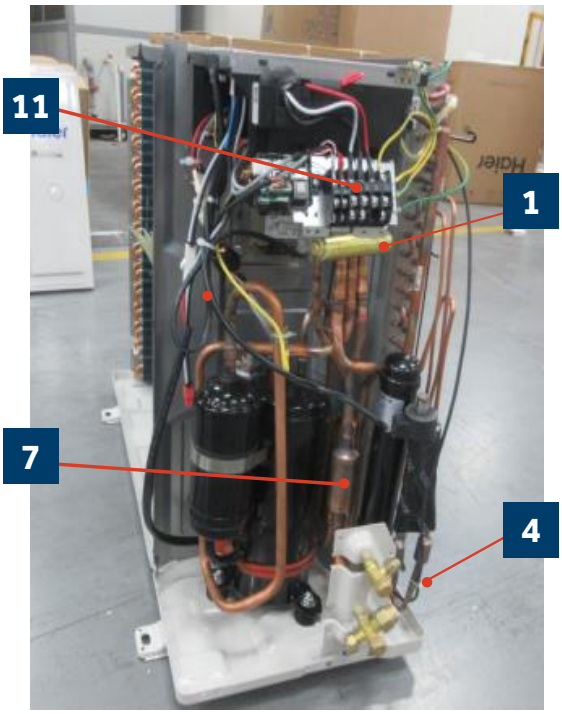
Outdoor Component Identification: 1G18ED2BEA

1. 4-Way Valve
2. Accumulator
3. Compressor
4. Defrost Temperature Sensor
5. Discharge Temperature Sensor
6. Electronic Expansion Valve
7. Refrigerant Strainers
8. Ambient Temperature Sensor
9. Fan Motor
10. Power Factor Reactor
11. Terminal Block
12. Power Control Board (PCB)
13. Fan Blade
14. Compressor Heater
15. Base Pan Heater

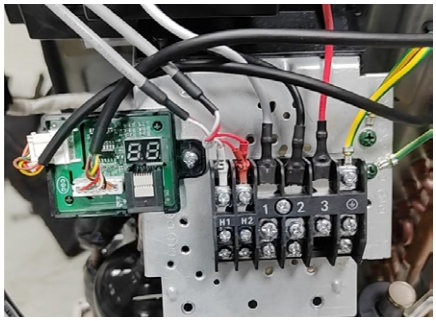








Terminal Block



The outdoor unit is powered by 208/230 volt single phase electricity connected at the terminal block.

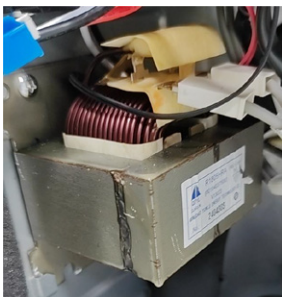
Terminals 1 and 2 connect this voltage to the system.

The number 3 terminal is communication that connects wiring between the indoor and outdoor units. A ground terminal connects the outdoor unit to the line voltage power source.

The indoor unit is also powered by the same electrical supply as the outdoor unit. Only 14-4 stranded copper wire is allowed connected to the wiring terminal block at the outdoor unit and is run to the same terminals on the indoor terminal block.

When installing the field supplied wiring, make certain the wire gauge is correct. There should not be any electrical wiring splices between the indoor unit and outdoor unit wire connection 3. This wire is used to carry communication data between the indoor and outdoor units. A wiring splice where wires are twisted in a wire nut may cause deformation of the communication signal. If communication is lost between the indoor and outdoor units, an ERROR CODE E7 will occur.

Power Factor Reactor



The Reactor is a power filter. It is unlikely to ever have an electrical failure of this component.

The Reactor of all outdoor units is electrically connected to the IPM on terminal connections CN-5 and CN-6.

Compressor

The compressor is a three phase DC inverter driven rotary type, capable of variable speed operation. The compressor operating frequency will be determined by the temperature difference between set point and room temperature.

The compressor of all outdoor units is electrically connected to the 1PM on terminal connections CN-7, CN-8 and C-9.

Protection of the compressor will be provided by the discharge temperature sensor, the suction line temperature sensor, and the over current protection parameter in the PCB.

Fan Motor

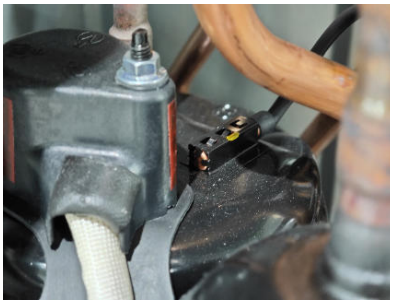
The fan motor is a variable speed motor. The required speed is calculated by the PCB. The motor is electrically connected to the PCB via PLUG CN-10.

In COOL MODE, the motor will slow down as outdoor air temperature falls. In HEAT MODE, the motor will increase speed as the outdoor air temperature falls.

Temperature Sensors

These 3 sensors are part of an assembly and will all be changed together.

Discharge Temperature Sensor



The Discharge Temperature Sensor is a negative coefficient thermistor that senses the temperature of the compressor hot gas. The PCB monitors the temperature of the compressor hot gas and will make inverter speed changes in response to input from this device.

This sensor connects to the Main Control Board at PLUG CN-15.

Defrost Temperature Sensor

The Defrost Temperature Sensor is a negative coefficient thermistor that will change resistance in response to outdoor coil temperature changes. The PCB monitors the temperature of the outdoor coil to determine when the system should perform a defrost cycle. The sensor also monitors coil temperature during defrost cycles to determine termination conditions.

This sensor connects to the Main Control Board at PLUG CN-15.

Outdoor Ambient Temperature Sensor

The Ambient Temperature Sensor is a negative coefficient thermistor that will change resistance in response to outdoor air temperature changes. The PCB monitors the temperature of the outdoor air to determine fan speed requirements and inverter speed. The sensor also plays a role in calculation of required defrost conditions.

This sensor connects to the Main Control Board at PLUG CN-15

4-Way Valve

The 4-Way Valve redirects the flow of refrigerant in the piping circuit to allow the system to reverse the functions of the indoor and outdoor coils. When de-energized in COOL MODE, the valve will direct the refrigerant hot gas to the outdoor coil. When energized in HEAT MODE, the valve will direct the hot gas to the indoor coil.

The valve flow direction capability is controlled by an electrical solenoid. When energized with 208/230 VAC, the solenoid will magnetically move an internal slide within the 4-Way Valve to change the direction of refrigerant flow.

The 4-Way Valve is electrically connected to the Main Control Board at PLUG CN-11.

Electronic Expansion Valve

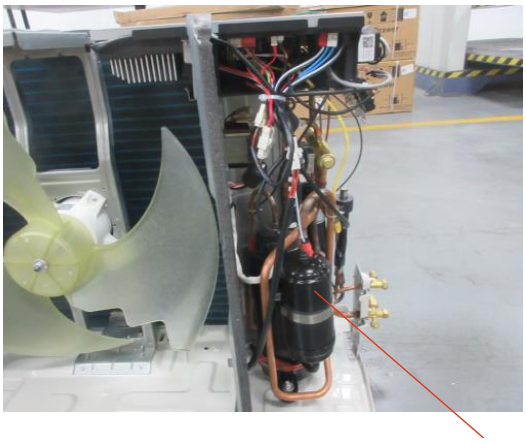
The metering device is an electronic expansion valve. The valve consists of an electrical operator and a valve body with internal variable size orifice. When operating, the PCB will send pulses of voltage to the electrical operator. The operator will then magnetically move the position of the metering orifice pin to vary refrigerant flow.

The metering device position is determined by input from a Suction Line Temperature Sensor. The EEV will change the internal orifice size to maintain an acceptable level of superheat.

During COOL MODE the valve meters low pressure refrigerant to the indoor coil. During HEAT MODE the valve meters low pressure refrigerant to the outdoor coil.

The electrical expansion valve is electrically connected to the Main Control Board at PLUG CN-16.

Accumulator



The Accumulator is located in the suction line circuit at the entrance to the compressor. The accumulator helps prevent liquid refrigerant from entering the compressor during run operation.

Refrigerant Strainers

The system has debris-catching strainers that protect internal system components from contaminants in the refrigerant. The strainer is a permanent part that is not typically replaced.

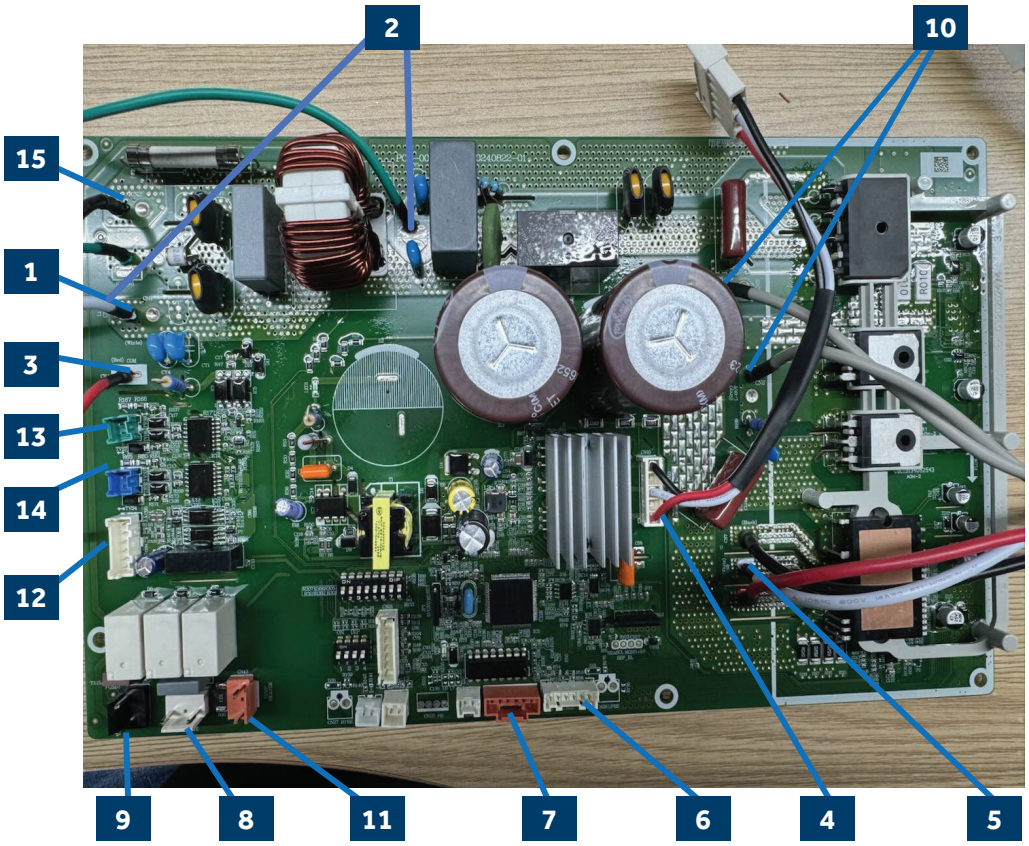
Compressor Heater

The Compressor heater is used to preheat the compressor and assist the start of the compressor at low temperature. The Compressor Heater is electrically connected to the Power Control Board at PLUG CN-13 and energized with 208/230 VAC.

Base Pan Heater

To keep condensate water from freezing inside the cabinet, a base pan heater is installed at the base pan. The Base Pan Heater is electrically connected to the Power Control Board at PLUG CN-12 and energized with 208/230 VAC.

Outdoor Unit Control Board



1 **CN1:** 230VAC power from terminal block connections 1(L1)

2 **CN3,CN30:** Connector for GND

3 **CN4:** Communication connection between the indoor board and the outdoor board

4 **CN10:** Connector for the fan motor

5 **CN7, CN8, CN9:** Compressor U, V, W connections

6 **CN15:** Connections for temperature sensors

7 **CN16:** Connector for the electronic expansion valve

8 **CN11:** Connector for four way valve coil

9 **CN12:** Connector for the base pan heater

10 **CN5, CN6:** Connector for the reactor

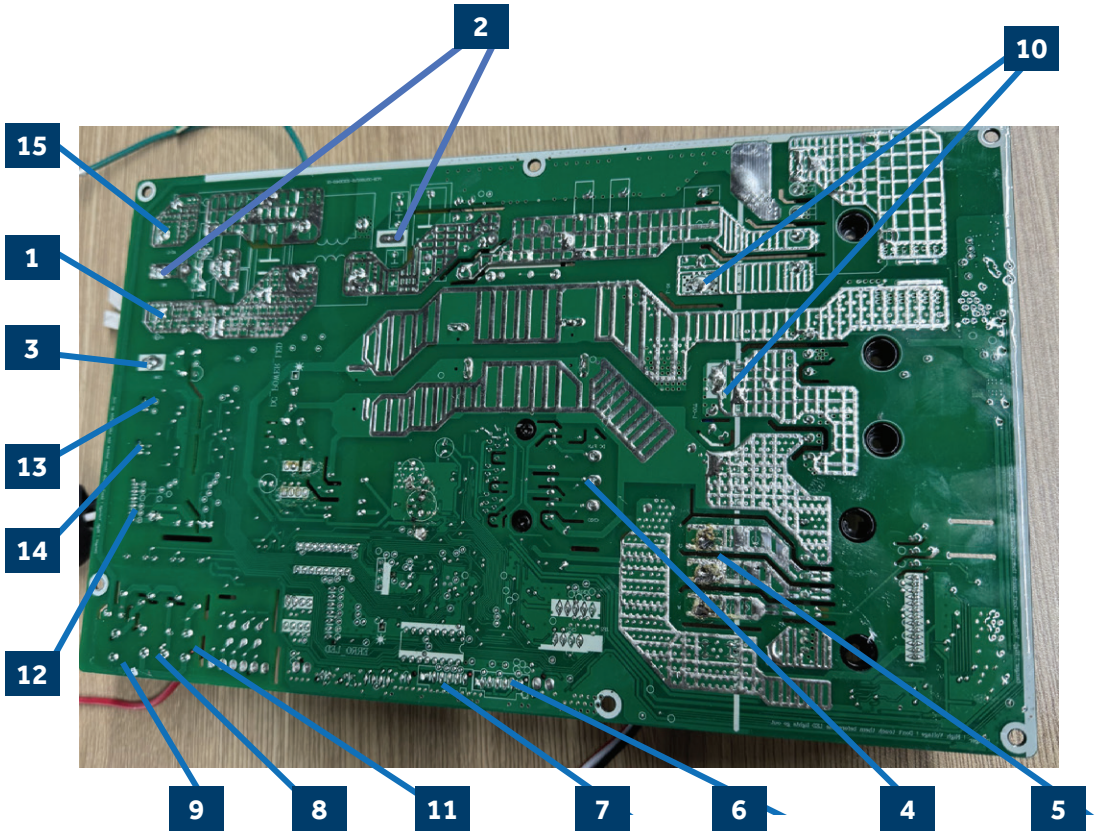
11 **CN13:** Connector for the compressor heater

12 **CN19:** Connector for the RJ45

13 **CN24:** Connector for the OTA

14 **CN14:** Connector for the centralized controller

15 **CN2:** 230VAC power from terminal block connections 2(L2)



1 **CN1:** 230VAC power from terminal block connections 1(L1)

2 **CN3,CN30:** Connector for GND

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7 **CN16:** Connector for the electronic expansion valve

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9 **CN12:** Connector for the base pan heater

10 **CN5, CN6:** Connector for the reactor

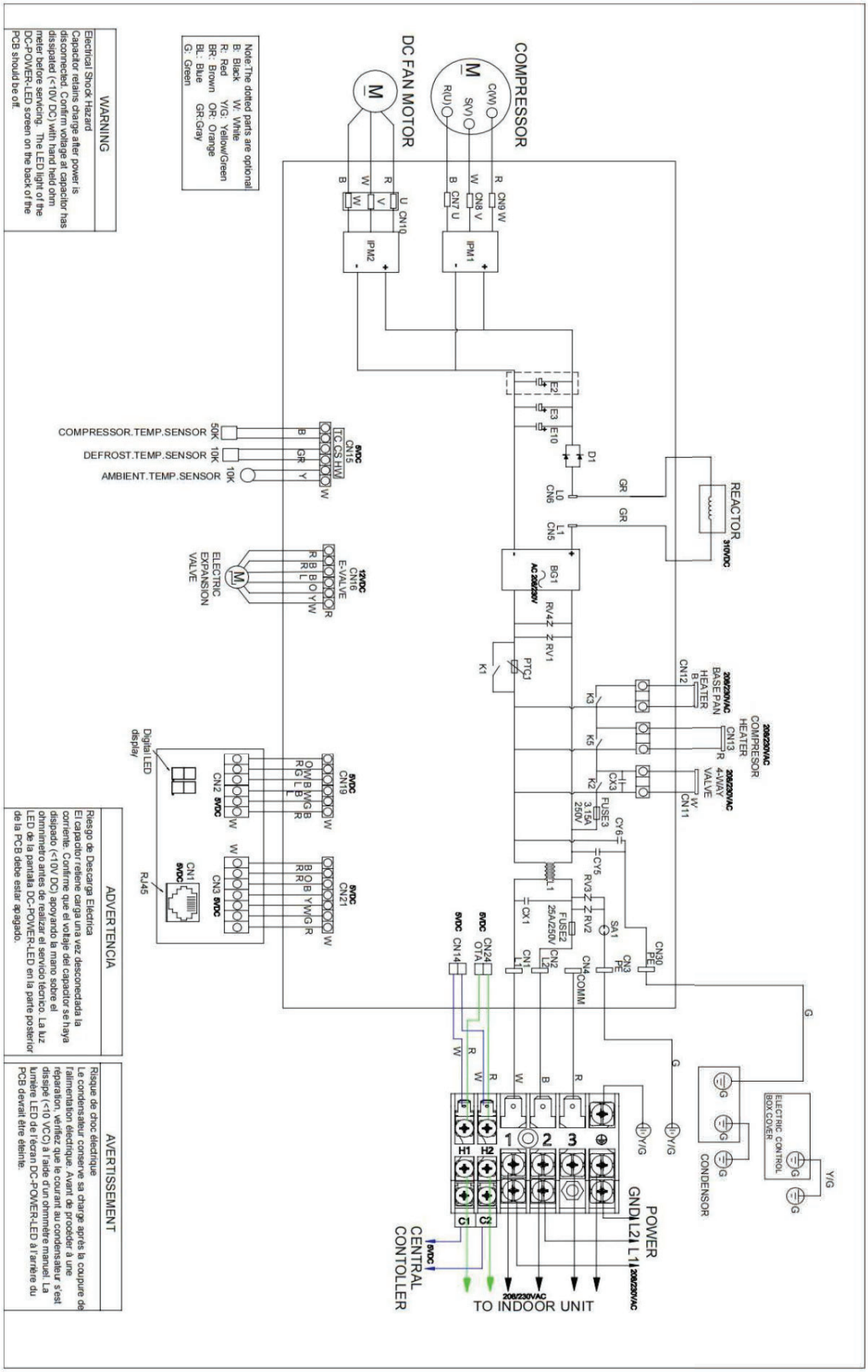
11 **CN13:** Connector for the compressor heater

12 **CN19:** Connector for the RJ45

13 **CN24:** Connector for the OTA

14 **CN14:** Connector for the centralized controller

15 **CN2:** 230VAC power from terminal block connections 2(L2)


COMPRESSOR
DC FAN MOTOR
REACTOR
310VDC
COMPRESSOR.TEMP.SENSOR 50K
DEFROST.TEMP.SENSOR 10K
AMBIENT.TEMP.SENSOR 10K
ELECTRIC EXPANSION VALVE
Digital LED display
RJ45
BASE PAN HEATER
COMPRESOR HEATER
4-WAY VALVE
ELECTRIC CONTROL BOX COVER
CONDENSOR
POWER GND L2 L1
CENTRAL CONTOLLER
TO INDOOR UNIT
208/230VAC
5VDC
12VDC
Note:The dotted parts are optional
B: Black W: White
R: Red Y/G: Yellow/Green
BR: Brown OR: Orange
BL: Blue GR:Gray
G: Green
WARNING
Electrical Shock Hazard
Capacitor retains charge after power is disconnected. Confirm voltage at capacitor has dissipated (<10V DC) with hand held ohm meter before servicing. The LED light of the DC-POWER-LED screen on the back of the PCB should be off.
ADVERTENCIA
Riesgo de Descarga Eléctrica
El capacitor retiene carga una vez desconectada la corriente. Confirme que el voltaje del capacitor se haya disipado (<10V DC) apoyando la mano sobre el ohmímetro antes de realizar el servicio técnico. La luz LED de la pantalla DC-POWER-LED en la parte posterior de la PCB debe estar apagado.
AVERTISSEMENT
Risque de choc électrique
Le condensateur conserve sa charge après la coupure de l'alimentation électrique. Avant de procéder à une réparation, vérifiez que le courant au condensateur s'est dissipé (<10 VCC) à l'aide d'un ohmmètre manuel. La lumière LED de l'écran DC-POWER-LED à l'arrière du PCB devrait être éteinte.

DIP SW1

SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	SW1-7	SW1-8	Setting	Description
OFF	----	----	----	----	----	----	----	AC Loop Communications	Default
ON	----	----	----	----	----	----	----	24V Communication	
----	OFF	----	----	----	----	----	----	Central Controller Protocol	Default
----	ON	----	----	----	----	----	----	BMS Protocol	
----	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Central Controller Address 1	Default
----	OFF	OFF	OFF	OFF	OFF	OFF	ON	Central Controller Address 2	
----	OFF	----	----	----	----	----	----	--	
----	OFF	ON	ON	ON	ON	ON	ON	Central Controller Address 64	
----	ON	OFF	OFF	OFF	OFF	OFF	OFF	BMS protocol Address 1	
----	ON	OFF	OFF	OFF	OFF	OFF	ON	BMS protocol Address 2	
----	ON	----	----	----	OFF	----	----	--	
----	ON	ON	ON	ON	ON	ON	ON	BMS Controller Address 64	

DIP SW2

SW2-1	SW2-2	SW2-3	SW2-4	Setting	Description
OFF	OFF	OFF	OFF	Endure 9K	
OFF	OFF	OFF	ON	Endure 12K	
OFF	OFF	ON	OFF	Endure 18K	
ON	OFF	ON	OFF	Reserved	
ON	OFF	ON	ON	Reserved	
ON	ON	OFF	OFF	Reserved	
ON	ON	OFF	ON	Reserved	
ON	ON	ON	OFF	Reserved	
ON	ON	ON	ON	Reserved	

NOTE: Component resistance readings shown in this section are for reference only. Actual resistance values may vary based on model being tested.

Testing of the following components requires the use of needle probes. Avoid testing the connector end of the plug, as damage to the internal sections of the plug can occur.

Checking the Outdoor Unit Sensors

NOTE: Use respective temperature / sensor chart for sensor type being tested.

- Compressor discharge sensor
- Suction sensor
- Defrost temperature sensor
- Ambient sensor

Step 1

Disconnect the sensor plug from the control board for this test. Failure to do so may provide inaccurate readings.

Step 2

Using k-type temperature probe, determine the temperature of the sensor being tested.

Step 3

Using an ohmmeter, check the resistance value of the sensor.

Step 4

Referring to the temperature / resistance table for the sensor being checked, verify the resistance value corresponds to the temperature checked in Step 2. Replace the sensor if the reading is open, shorted, or outside

Step 5

Re-seat the plug on the connector at the conclusion of the test.

Checking the Reversing Valve Coil

Step 1

Disconnect the reversing valve plug from the PCB for this test. Failure to do so may provide inaccurate readings.

Step 2

Using an ohmmeter, check the resistance value of the coil. The resistance value of the coil should be 1.2 kilo ohms to 1.8 kilo ohms. Replace the valve coil if the reading is significantly different, or if the coil shows open or shorted.

Step 3

Re-seat the plug on the connector at the conclusion of the test.

Checking the Compressor Windings

Step 1

Disconnect wiring from terminals U, V and W of the IPM.

Step 2

Using an Ohmmeter, check the resistance value of the compressor windings. Measure between wires U and V, U and W, and V, and W.

The resistance value of the windings should be balanced (equal +/-20%). If the resistance values are not equal, verify the wiring and connections to the compressor as well as the compressor itself. Repair or replace as needed.

Step 3

Reconnect the wiring to the IPM at the conclusion of the test.

Checking the EEV Coil

Step 1

Disconnect the EEV coil from the PCB for this test. Failure to do so may provide inaccurate readings.

Step 2

Measure the resistance between 6 and 4, 6 and 2,5 and 3,5 and 1, and the resistance,between them is roughly the same, all less than 100 Ohm.

Step 3

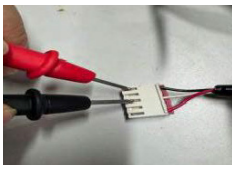
Re-seat the plug on the connector at the conclusion of the test.

Outdoor Fan Motor

Check that the wiring and plug connections are in good condition.

If the outdoor unit fan motor does not run, or the Service Monitor Board indicates an error code of 09, check the following voltages at connector CN11 on the outdoor unit PCB. Set the meter to read DC volts with a minimum voltage range of 350 volts. All voltage values are approximate. Initiate forced cooling.

1. DC voltage between the Red and Black wire, White and Black, and Red and Black wire connections should read 310 ~ 334 VDC.



If the outdoor fan initially runs, increases speed, then stops, and the Service Monitor Board indicates an error code of 09, the feedback circuit is not functioning. Check that the wiring and plug connections are in good condition.

DC Fan Motor	Value of Resistance	Model
0010404886	50±8%Ω	Endure 9K/12K
001040183U	30±8%Ω	Endure 18K

Checking the Compressor Heater

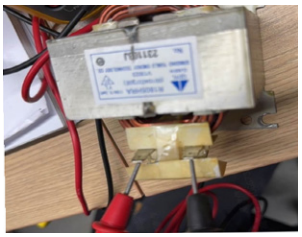
Use a multimeter to measure the resistance at both ends of the heating wire harness terminal of the compressor. The resistance value is 2400Ω ±5%.

Checking the Basepan Heater

Use a multimeter to measure the resistance at both ends of the heating wire harness terminal The resistance value is 352.6Ω±5%.

Checking the Reactor

Use a multimeter to test the resistance between two terminals of a reactor. The maximum resistance is 130mΩ.



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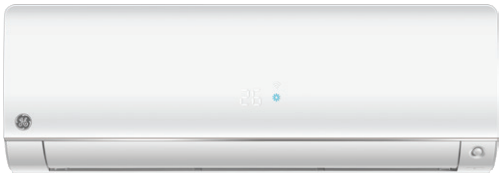


GS09WB2BEA
GS12WB2BEA
GS18WB2BEA

TABLE OF CONTENTS

Indoor Component Identification

Ambient Temperature Sensor

2 Display Panel

3 Fan Motor

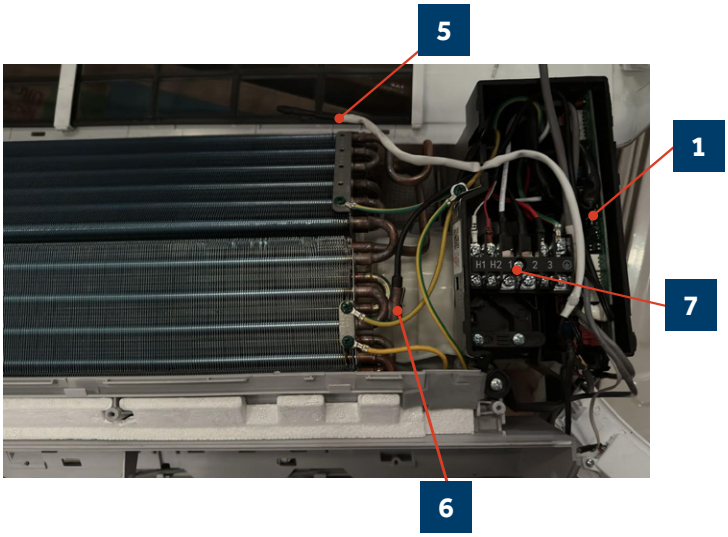
4 Louver Motors

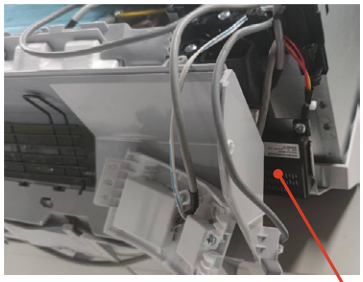
5 Power Control Board (PCB)

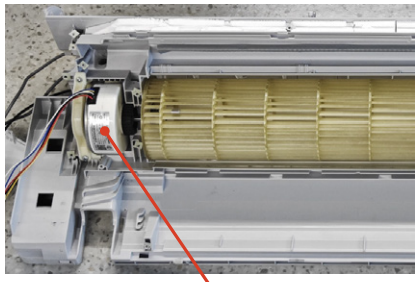
6 Piping Temperature Sensor

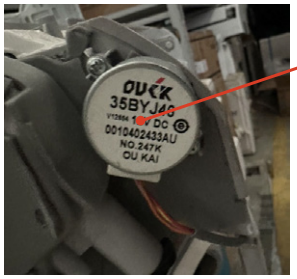
7 Terminal Block

8 R454B Leakage sensor

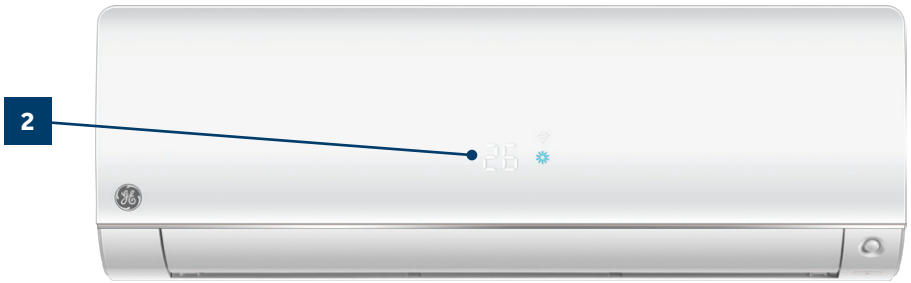


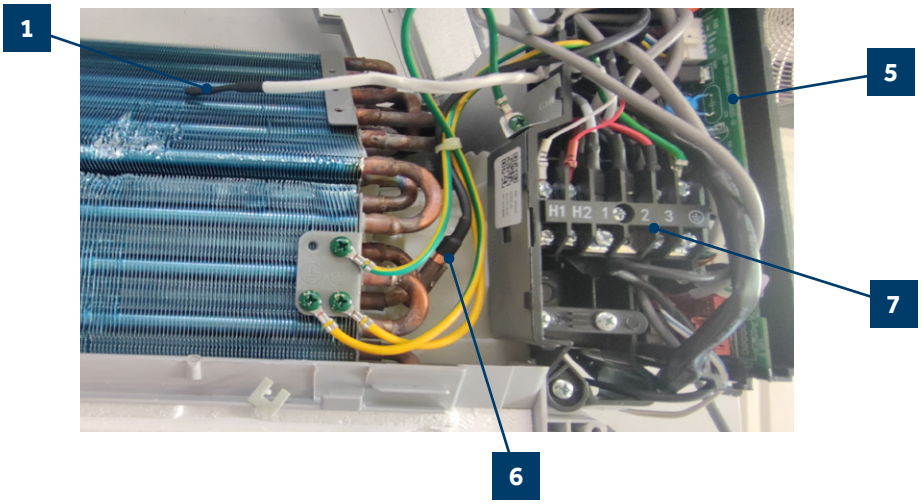


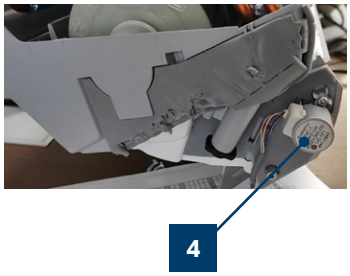


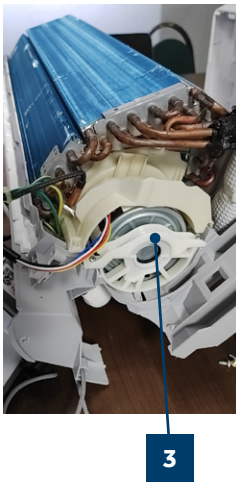


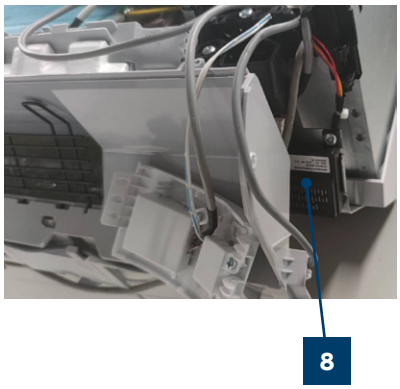
1. Ambient Temperature Sensor
2. Display Panel
3. Fan Motor
4. Louver Motors
5. Power Control Board (PCB)
6. Piping Temperature Sensor
7. Terminal Block
8. R454B Leakage sensor









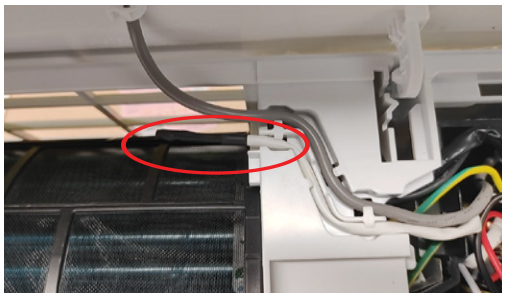


Terminal Block

The unit terminal block receives electrical power from the outdoor unit. There are 4 connections for electrical wires. Terminals 1 and 2 are connected to terminals 1 and 2 of the outdoor unit. This wiring supplies power to the indoor unit.

Terminal 3 is a communication wire. The indoor unit sends indoor air temperature, coil temperature and temperature setpoint information to the outdoor unit on this wire. If a splice or break in this wire is present, the indoor unit will not be able to communicate with the outdoor unit. The ERROR CODE will be an E7.

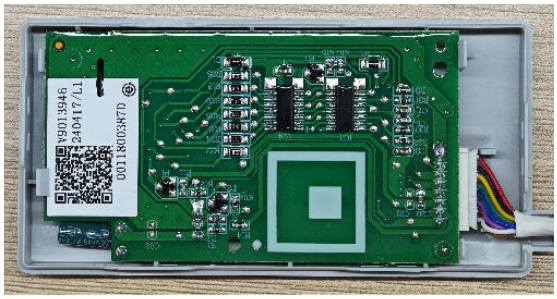
Ambient Temperature Sensor



The Ambient (room) Temperature Sensor is a negative coefficient thermistor that will decrease in resistance with increases in room air temperature. The sensor is located on a clip mounted in the return air stream.

The sensor connects to the control board at Plug CN-6.

Display



The indoor display has an infrared communication circuit that receives The indoor display has an infrared communication circuit that receives operating commands from the remote control. This display will indicate operating modes, error codes, indoor air temperature, timer status, and power status.
The display board connects to the control board at Plug CN-7.

Piping Temperature Sensor

The Piping Temperature Sensor is a negative coefficient thermistor that will decrease in resistance with increases in coil temperature. The sensor is located in a socket soldered to the surface of the indoor coil.

This sensor will monitor the temperature of the indoor coil in both cooling and heating modes of operation. Should abnormally cold or hot coil temperature be detected by this sensor, the system will take steps to correct the condition or report an ERROR CODE.

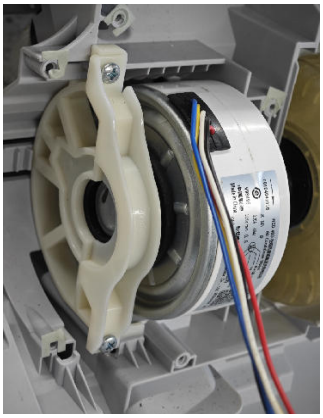
The sensor connects to the control board at Plug CN-6.

Louver Stepper Motor

The motor moves the louver side to side depending upon selections made at the remote control.

These motors are connected at CN-5.

Fan Motor



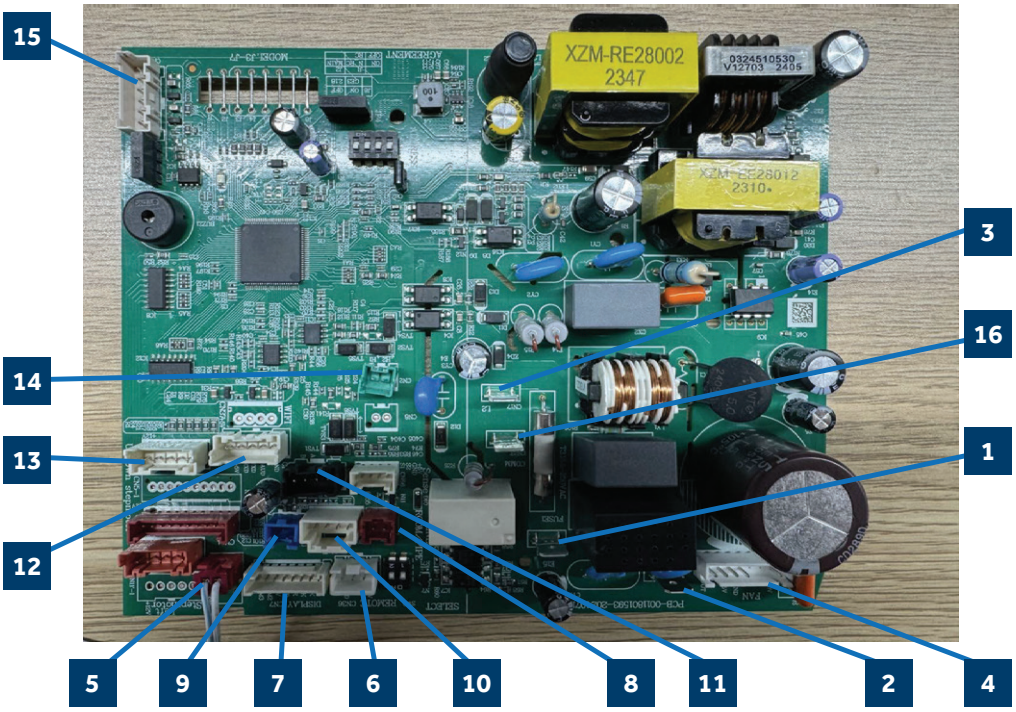
The Fan Motor is a variable speed motor. Fan speed will vary depending upon the temperature variation from set point, or can be set with the remote control to maintain a single set speed.

The Fan Motor is connected to the indoor control board via PLUG CN-9.

Emergency Button

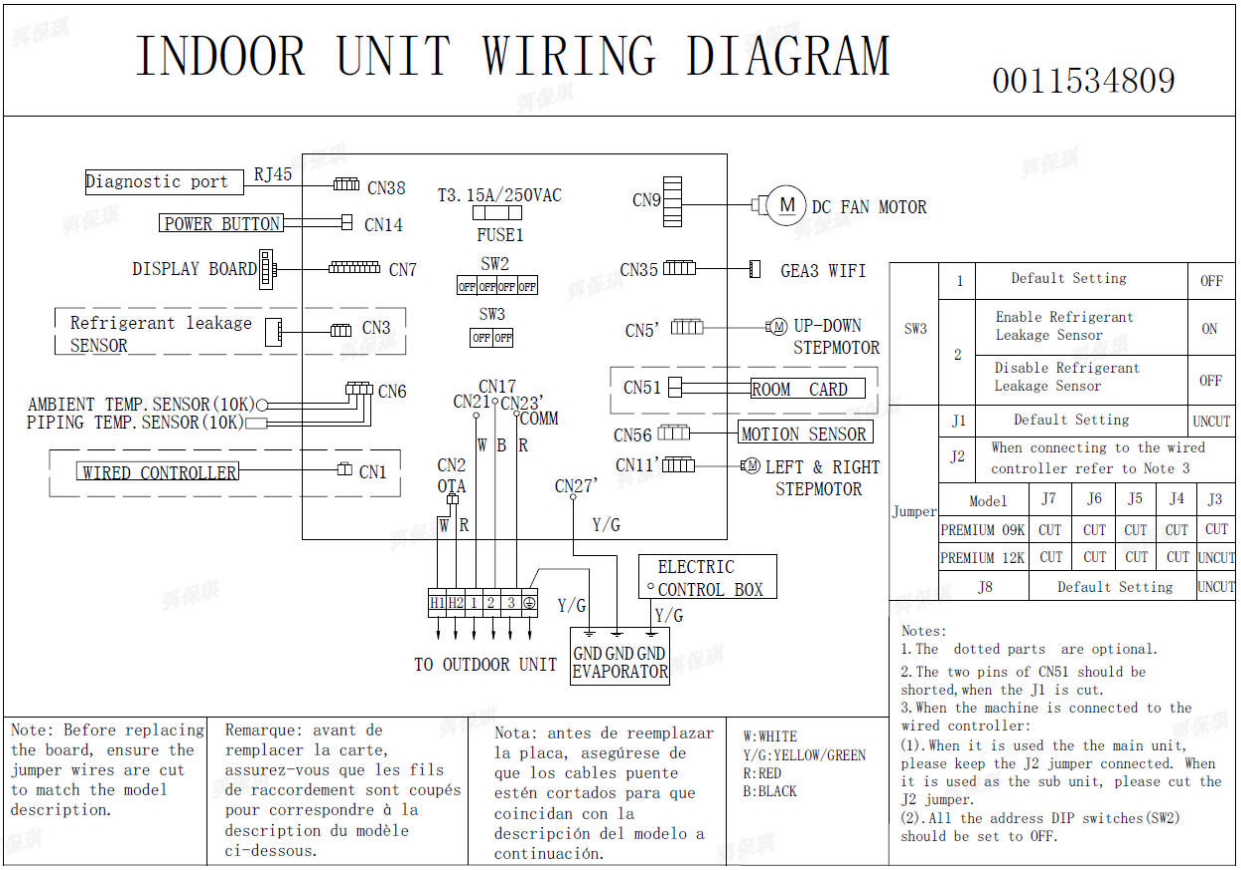
If the remote control is non-functional, the Emergency Button can be used. 73 -78^{O}F will be maintained, until commands are received via the remote control.

Indoor Unit Control Board



1	CN21: 208/230 AC power from terminal block connections 1(L1)
2	CN27: Connector for GND
3	CN23: Communication connection between the indoor board and the outdoor board
4	CN9: Connector for fan motor
5	CN14: Connector for emergency switch
6	CN36: Connector for the centralized controller
7	CN7: Connector for the display board
8	CN1: Connector for non-polar wire controller
9	CN51: Connector for the room cord
10	CN6: Connector for the temperature sensor
11	CN3: Connector for the leakage sensor
12	CN35: Connector for the WIFI
13	CN5: Connector for the up-down step motor
14	CN2: Connector for the OTA
15	CN38: Connector for the RJ45
16	CN17: 208/230 AC power from terminal block connections 2(L2)

GS09WP2BEA, GS12WP2BEA



SW3	1	Default Setting	OFF
	2	Enable Refrigerant Leakage Sensor	ON
		Disable Refrigerant Leakage Sensor	OFF
Jumper	J1	Default Setting	UNCUT
	J2	When connecting to the wired controller refer to Note 3	

Model	J7	J6	J5	J4	J3
PREMIUM 09K	CUT	CUT	CUT	CUT	CUT
PREMIUM 12K	CUT	CUT	CUT	CUT	UNCUT
J8	Default Setting				UNCUT

Notes:
1. The dotted parts are optional.
2. The two pins of CN51 should be shorted, when the J1 is cut.
3. When the machine is connected to the wired controller:
(1). When it is used the the main unit, please keep the J2 jumper connected. When it is used as the sub unit, please cut the J2 jumper.
(2). All the address DIP switches(SW2) should be set to OFF.

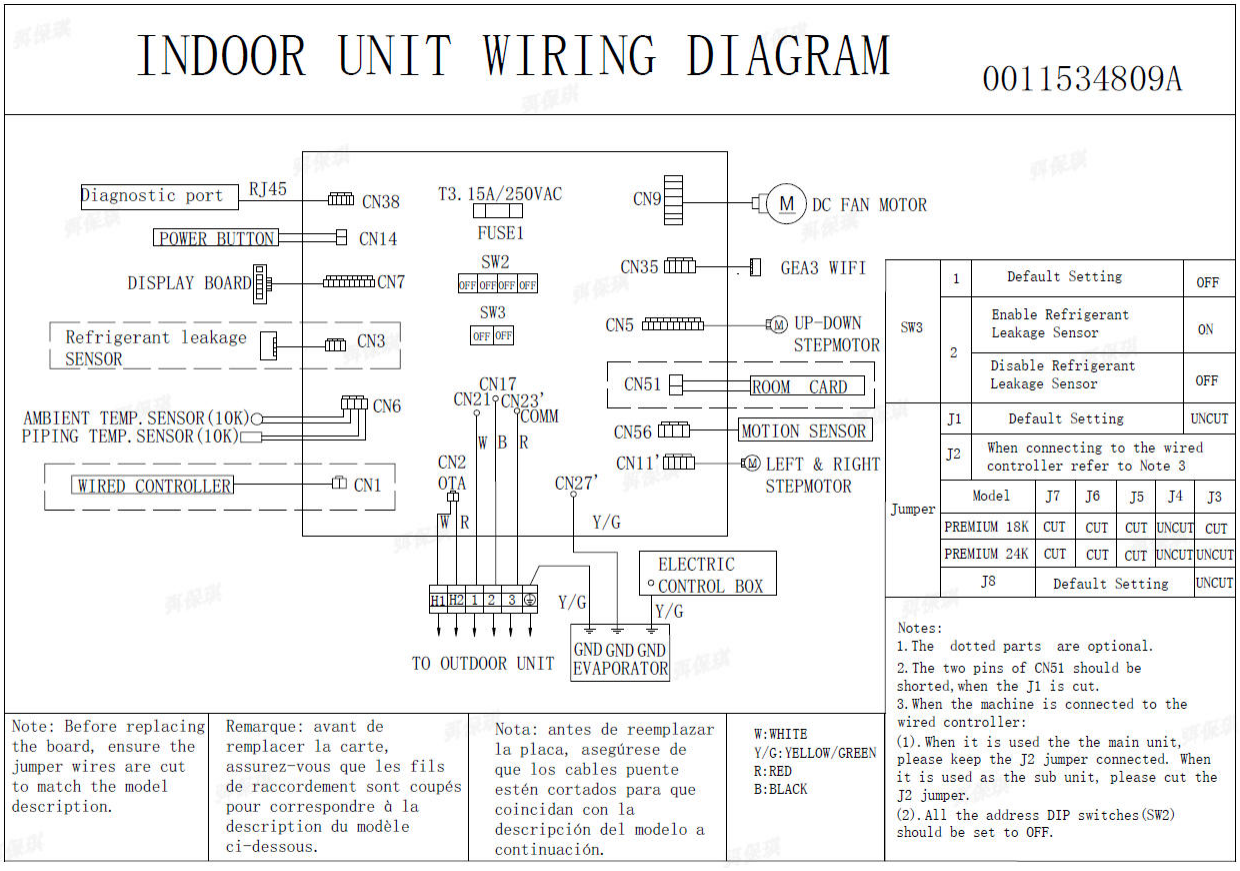
Note: Before replacing the board, ensure the jumper wires are cut to match the model description.

Remarque: avant de remplacer la carte, assurez-vous que les fils de raccordement sont coupés pour correspondre à la description du modèle ci-dessous.

Nota: antes de reemplazar la placa, asegúrese de que los cables puente estén cortados para que coincidan con la descripción del modelo a continuación.

W:WHITE
Y/G:YELLOW/GREEN
R:RED
B:BLACK

GS18WP2BEA



SW3	1	Default Setting	OFF
	2	Enable Refrigerant Leakage Sensor	ON
		Disable Refrigerant Leakage Sensor	OFF
Jumper	J1	Default Setting	UNCUT
	J2	When connecting to the wired controller refer to Note 3	

Model	J7	J6	J5	J4	J3
PREMIUM 18K	CUT	CUT	CUT	UNCUT	CUT
PREMIUM 24K	CUT	CUT	CUT	UNCUT	UNCUT
J8	Default Setting				UNCUT

Notes:
1. The dotted parts are optional.
2. The two pins of CN51 should be shorted, when the J1 is cut.
3. When the machine is connected to the wired controller:
(1). When it is used the the main unit, please keep the J2 jumper connected. When it is used as the sub unit, please cut the J2 jumper.
(2). All the address DIP switches(SW2) should be set to OFF.

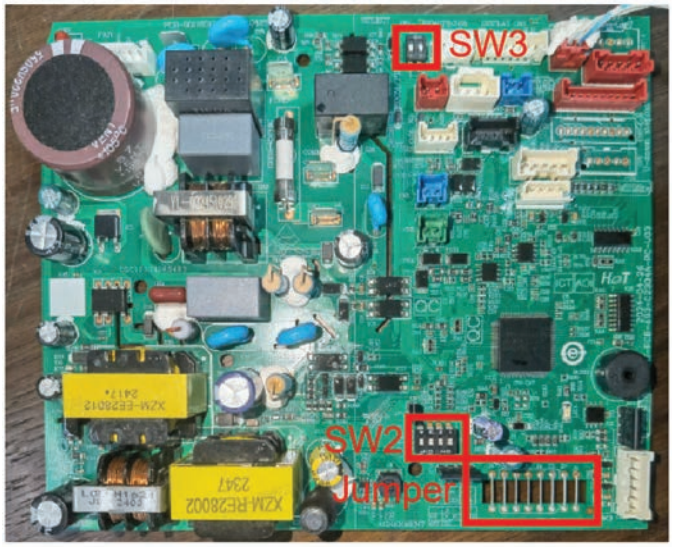
Note: Before replacing the board, ensure the jumper wires are cut to match the model description.

Remarque: avant de remplacer la carte, assurez-vous que les fils de raccordement sont coupés pour correspondre à la description du modèle ci-dessous.

Nota: antes de reemplazar la placa, asegúrese de que los cables puente estén cortados para que coincidan con la descripción del modelo a continuación.

W:WHITE
Y/G:YELLOW/GREEN
R:RED
B:BLACK

DIP SWITCH & JUMPER SETTINGS



DIP SW2: Wire Controller Address

SW2-1	SW2-2	SW2-3	SW2-4	Setting	Description
OFF	OFF	OFF	OFF	0#	Default
OFF	OFF	OFF	ON	1#	
OFF	OFF	ON	OFF	2#	
OFF	OFF	ON	ON	3#	
OFF	ON	OFF	OFF	4#	
OFF	ON	OFF	ON	5#	
OFF	ON	ON	OFF	6#	
OFF	ON	ON	ON	7#	
ON	OFF	OFF	OFF	8#	
ON	OFF	OFF	ON	9#	
ON	OFF	ON	OFF	10#	
ON	OFF	ON	ON	11#	
ON	ON	OFF	OFF	12#	
ON	ON	OFF	ON	13#	
ON	ON	ON	OFF	14#	
ON	ON	ON	ON	15#	

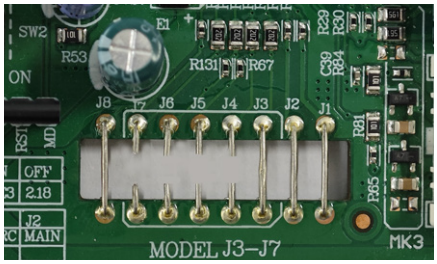
DIP SW3

SW3-1	SW3-2	Setting	Description
OFF	--	Central Controller	Default
ON	--	24v Controller	
--	OFF	Refrigerant Leak Detector Disable	Default
--	ON	Refrigerant Leak Detector Enable	

Jumpers J1, J2, J8

J1	J2	J8	J4	Setting	Description
OFF	--	--	--	Room Card Valid	
ON	--	--	--	Room Card Invalid	Default
--	OFF	--	--	Sub	
--	ON	--	--	Main	Default
--	--	OFF	--	WiFi 2.18 Protocol	
--	--	ON	--	WiFi GE3 Protocol	Default

The PCB has a set of jumper wires that must be checked when replacing the PCB. The replacement PCB is shipped with no jumper wires cut.

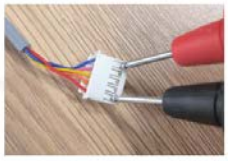


Jumpers J3-J7

J7	J6	J5	J4	J3	Setting
OFF	OFF	OFF	OFF	OFF	Endure 9K
OFF	OFF	OFF	OFF	ON	Endure 12K
OFF	OFF	OFF	ON	OFF	Endure 18K
OFF	OFF	ON	OFF	OFF	Reserved
OFF	OFF	ON	OFF	ON	Reserved
OFF	ON	ON	ON	OFF	Reserved
OFF	ON	ON	ON	ON	Reserved
ON	OFF	OFF	OFF	OFF	Reserved
ON	OFF	OFF	OFF	ON	Reserved
ON	OFF	OFF	ON	OFF	Reserved
--	--	--	--	--	Reserved
ON	ON	ON	ON	ON	Reserved

Checking the Stepper Motors

GS09WP2BEA, GS12WP2BEA



The resistance value of the relative common terminal of the stepping motor 4 is 200 ± 7Ω

GS18WP2BEA

The resistance value of the relative common terminal of the stepping motor4 is 300 ± 7Ω

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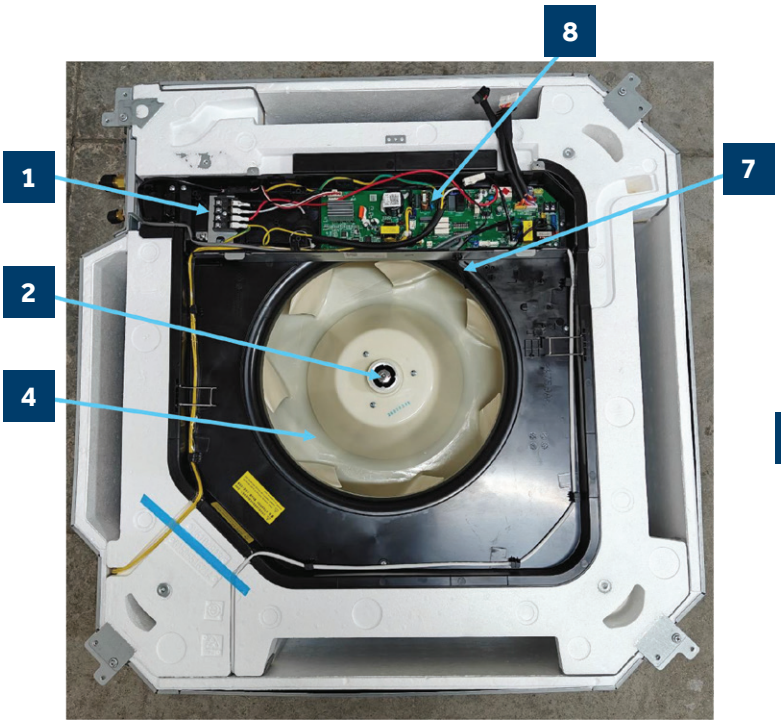
US09CB2BEA
US12CB2BEA
US18CB2BEA

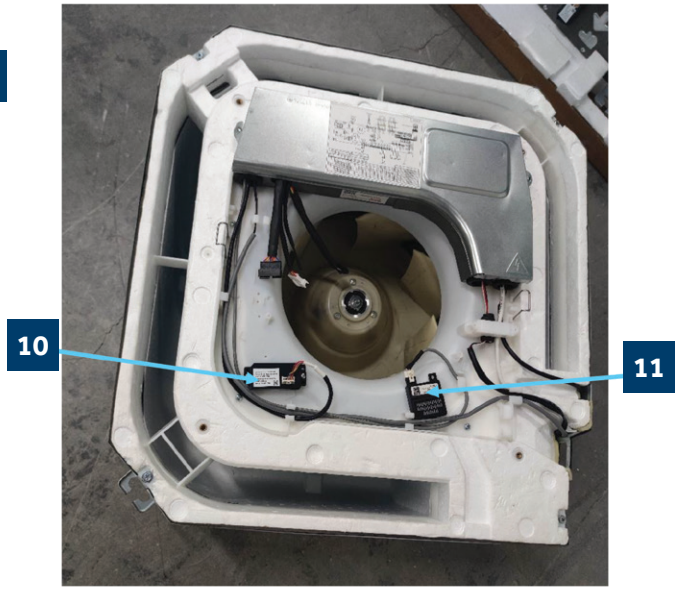
TABLE OF CONTENTS

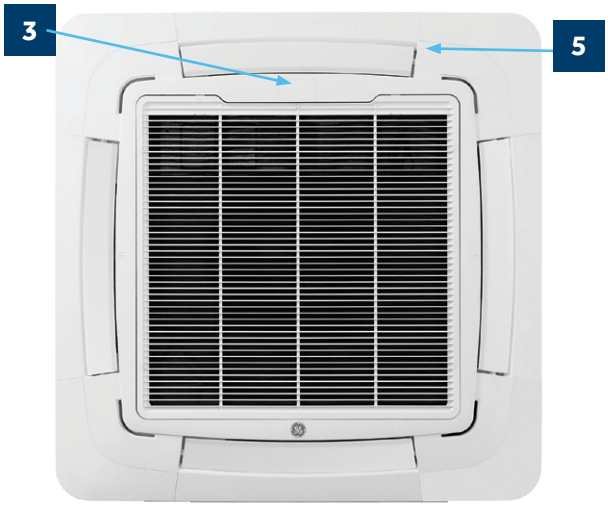
COMPONENTS

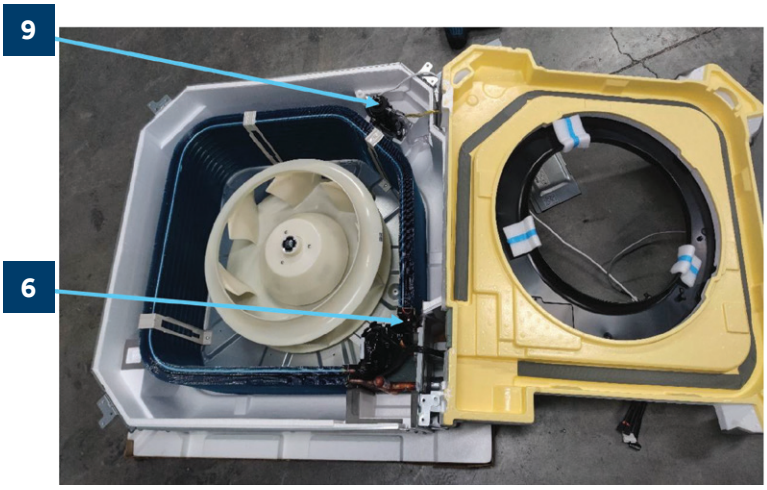
Indoor Component Identification

US09CB2BEA / US12CB2BEA / US18CB2BEA / US24LB2BEA / US30LB2BEA / US36LB2BEA

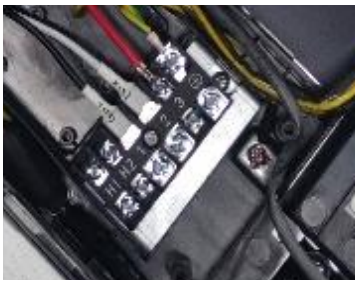








1 Terminal Block



Power to operate the indoor unit comes from the line voltage terminal block at the outdoor unit. The wiring includes 4 wires: 1, 2, 3 and ground. Wires 1 and 3 complete the data path. These wires should always be 14 gauge AWG stranded cooper, non-shielded type wire. Splices in wires 1 or 3 may cause communication errors.

2 Blower Motor

The multi-speed blower motor will change speed to match the capacity demand from the outdoor unit. The blower motor is controlled by both the remote control and by commands from the outdoor unit ECU. The indoor blower motor is connected to the indoor unit control board. The wiring from the motor to the indoor board consists of four wire connected to pins Common, Low, Medium, and High speeds. During normal operation, the indoor control board will energize the indoor blower motor and request proper speed. The motor has a run capacitor that is located in the cassette unit's control box. The run capacitor connects to the motor via two orange wires. The capacitor is field-replaceable.

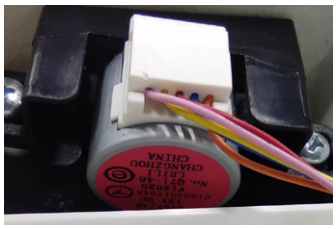
3 Display

The indoor unit has a display that communicates system mode. The indoor unit does not display temperatures or diagnostic codes. When a wired controller is used, this information is displayed on the wired controller. It is recommended to use a wired controller with the cassette unit. When servicing a diagnostic error, ALWAYS refer to the outdoor unit code to make diagnostic decision

4 Blower Assembly

The blower assembly consists of a plastic blower wheel that is connected to a PSC indoor blower motor. A set screw holds the blower wheel to the blower motor.

5 Louver Motors



The louver motors are stepper type motors that move the louvers up/down. The motors are controlled by pulsed voltage that cannot be measured. If the louver does not move when it should, check for a bind in the louvers.

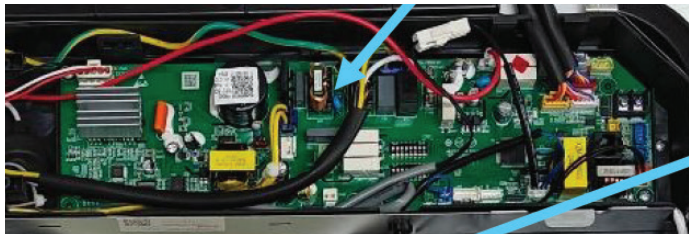
6 Piping Temperature Sensor

The Piping Temperature Sensor senses indoor coil temperature in the cooling mode and in the heating mode. This sensor is used for Anti Freezing and Anti Cold Blow cycles. The sensor also provides critical temperature information to the ECU that may be used in frequency adjustments.

7 Ambient Temperature Sensor

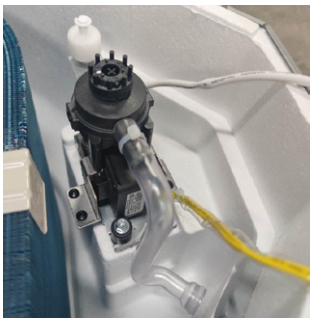
The Ambient Temperature Sensor senses room temperature. This sensor provides room temperature information to the ECU for calculation of inverter capacity and temperature control. Both sensors are negative temperature coefficient type that reduce electrical resistance as temperature rises.

8 Control Board



The indoor unit circuit board controls the switching functions of the indoor unit. All control decisions are made by the outdoor unit ECU. The indoor board has some limited diagnostic capability which will be covered in this manual. Condensate Pump & Float Switch

9 Condensate Pump & Float Switch



In cooling mode (including automatic cooling operation and emergency switch setting cooling mode and dehumidification mode), the pump operates when the compressor is on, and the pump 5 minutes after. For other modes such as conversion heating pump, it also continues to operate for 5 minutes after.

Cooling standby, heating and fan mode, the pump does not run. When the float switch is opened, the water tank is full.

After the controller detects this signal for 2 seconds, the pump starts to work. After the float recovers, the pump continues to work 5 for an additional minutes.

Continuous detection of water full signal for more than 5 minutes, will stop the compressor. The pump continues to operate for 5 minutes. If the float switch is still open or disconnected, the drainage system is reported to be faulty. After the fault, the pump continues to operate until it is detected that the float switch is closed or for 5 minutes.

10 WiFi

Receives and sends wireless signals to enable APP control of system operation

11 Refrigerant Leakage Detector

Detects the concentration of refrigerant in the air. When the refrigerant leakage sensor detects a concentration = 10% of lower flammability limit, an alarm is triggered.

bA No refrigerant leakage detector is installed.

1. The sensor is not detected.
2. If the bA fault is still reported, the refrigerant sensor is abnormal.

AA LFL leakage higher than X% is detected.

1. Cut off the refrigerant, whether Ab is displayed after the refrigerant drops. If so, the sensor is normal; If Ab is not displayed consistently after the refrigerant concentration decreases, the detector is abnormal and needs to be replaced.

AC Communication failure.

1. Check wiring connections. If the fault persists, replace the sensor cable.

Ad Self-check fault.

1. The refrigerant sensor is missing (open circuit), install a new detector.
2. Detector bypass (short circuit). Replace the detector wiring harness. If the fault persists, replace the detector.
3. Detector output exceeds the declared range of the sensor or the expected state is abnormal, replace the refrigerant sensor.

AE/AF Detector life warning

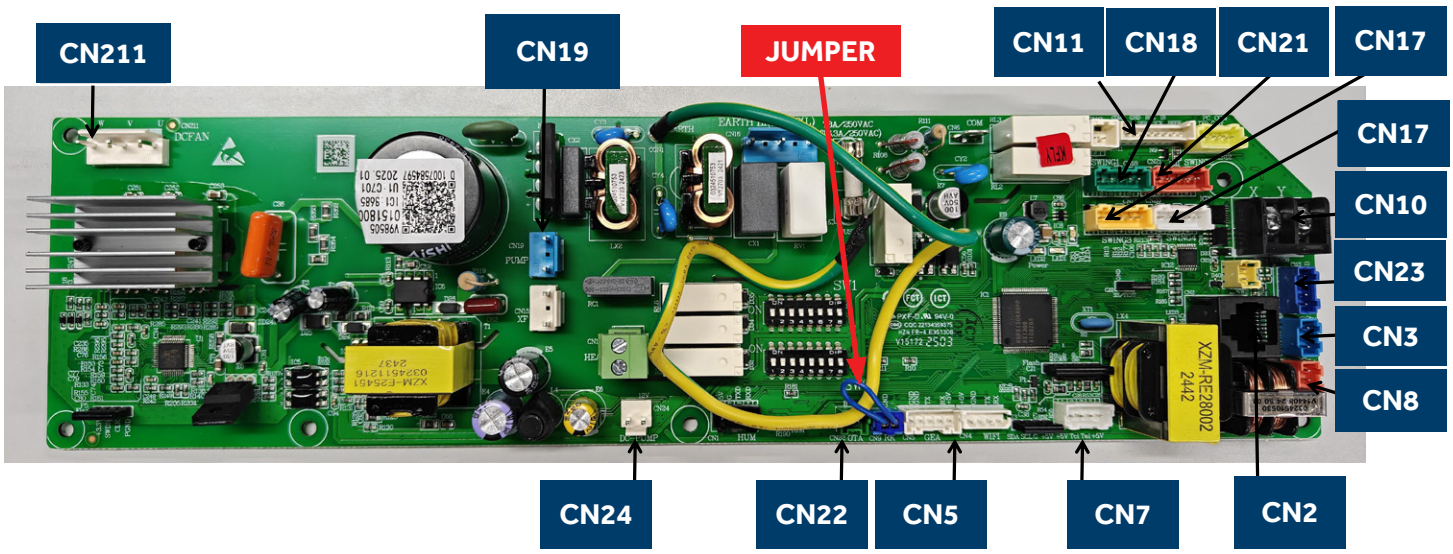
1. The fault is cleared after a new sensor is installed. If the fault persists, it may be a drive board fault.

Dip Switch SW1-5:

0: Refrigerant leakage detector function valid
1: Refrigerant leakage detector function invalid

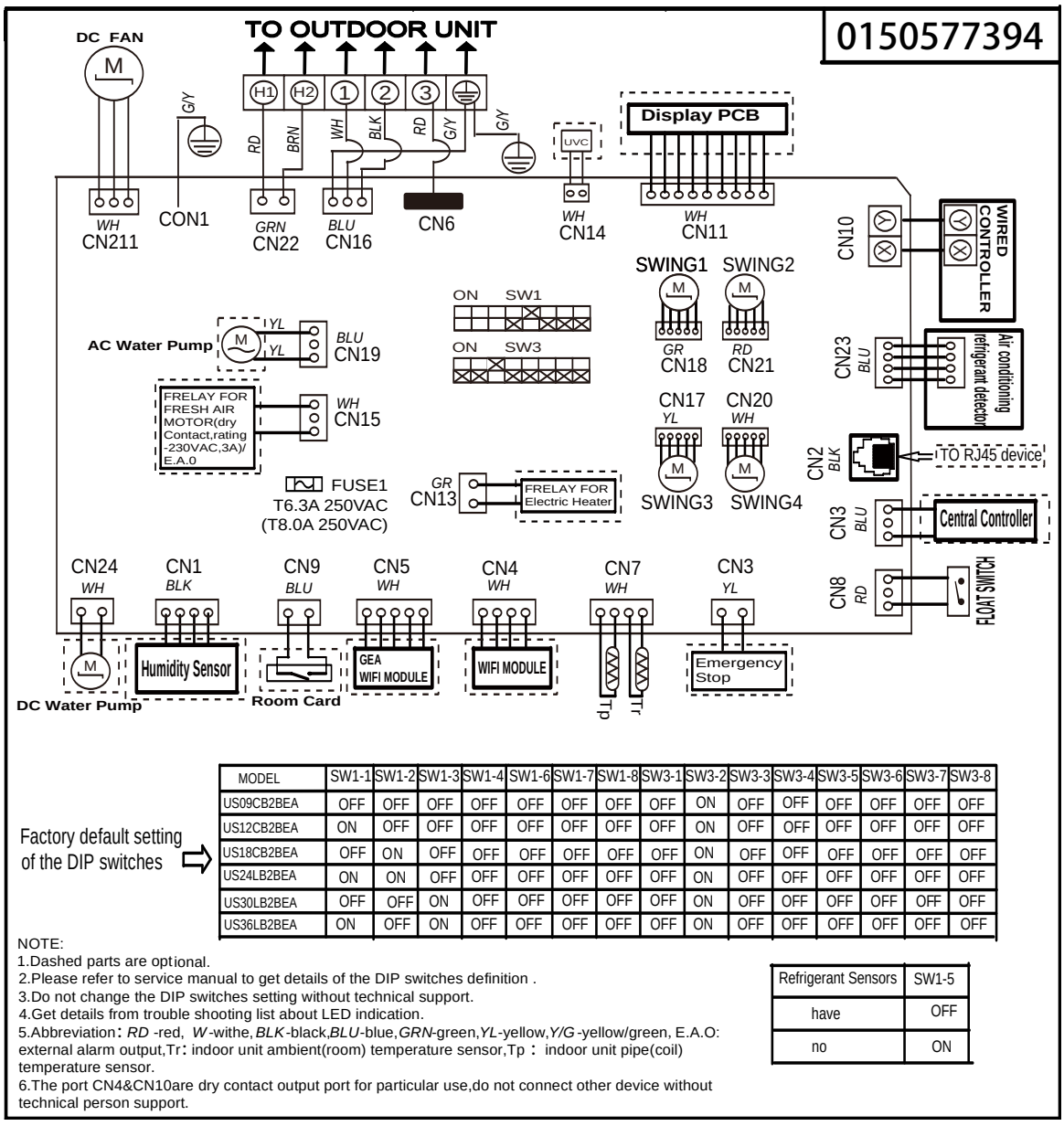
PCB Overview

0151800985



CN2	RJ45 Communication
CN3	Remote Control
CN5	WiFi
CN7	Sensor
CN8	Float Switch
CN10	Wired Controller
CN11	Light Board
CN17	Swing Motor
CN18	Swing Motor
CN19	AC Drain Pump
CN20	Swing Motor
CN21	Swing Motor
CN22	OTA485 Communication
CN23	Refrigerant Sensor
CN24	DC Drain Pump
CN211	Fan Motor

US09CB2BEA / US12CB2BEA / US18CB2BEA



Factory default setting of the DIP switches

MODEL	SW1-1	SW1-2	SW1-3	SW1-4	SW1-6	SW1-7	SW1-8	SW3-1	SW3-2	SW3-3	SW3-4	SW3-5	SW3-6	SW3-7	SW3-8
US09CB2BEA	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
US12CB2BEA	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
US18CB2BEA	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
US24LB2BEA	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
US30LB2BEA	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
US36LB2BEA	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF

NOTE:
1.Dashed parts are optional.
2.Please refer to service manual to get details of the DIP switches definition .
3.Do not change the DIP switches setting without technical support.
4.Get details from trouble shooting list about LED indication.
5.Abbreviation: *RD* -red, *W*-withe, *BLK*-black,*BLU*-blue,*GRN*-green,*YL*-yellow,*Y/G*-yellow/green, E.A.O: external alarm output,Tr: indoor unit ambient(room) temperature sensor,Tp : indoor unit pipe(coil) temperature sensor.
6.The port CN4&CN10are dry contact output port for particular use,do not connect other device without technical person support.

Refrigerant Sensors	SW1-5
have	OFF
no	ON

DIP SW1

SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	SW1-7	SW1-8	Description
OFF	OFF	OFF	-	-	-	-	-	09K
ON	OFF	OFF	-	-	-	-	-	12K
OFF	ON	OFF	-	-	-	-	-	18K
-	-	-	OFF	-	-	-	-	Room Card Valid
-	-	-	ON	-	-	-	-	Room Card Invalid
-	-	-	-	OFF	-	-	-	Refrigerant Detector Functional
-	-	-	-	ON	-	-	-	The Refrigerant Detector Invalid
-	-	-	-	-	OFF	-	-	Fresh Air
-	-	-	-	-	ON	-	-	Fault Alarm
-	-	-	-	-	-	OFF	-	None - Filter Alarm Reminder + Refrigeration Fan Stops
-	-	-	-	-	-	ON	-	Filter Alarm Reminder + Refrigeration Fan Does Not Stop
-	-	-	-	-	-	-	OFF	Us Models
-	-	-	-	-	-	-	ON	Non-Us Models

DIP SW3

SW3-1	SW3-2	SW3-3	SW3-4	SW3-5	SW3-6	SW3-7	SW3-8	Description
OFF	-	-	-	-	-	-	-	Special Fresh Air Selection For Duct Unit: Valid
ON	-	-	-	-	-	-	-	Special Fresh Air Selection For Duct Unit: Invalid
-	OFF	-	-	-	-	-	-	Cassette Single Swing Wind - Synchronized Swing Of Swing Blades
-	ON	-	-	-	-	-	-	Cassette Unit Four Swing Wind - Four Swing Blades Swing At Different Angles, Misaligned Swing
-	-	OFF	-	-	-	-	-	Electrical Heating: Invalid
-	-	ON	-	-	-	-	-	Electrical Heating: Valid
-	-	-	OFF	-	-	-	-	Model: Ultra-Slim Ducted Unit With 4-Level Static Pressure
-	-	-	ON	-	-	-	-	Model: Medium Static Pressure Duct With 10-Level Static Pressure Adjustment
-	-	-	-	OFF	OFF	OFF	OFF	0# (Wired Control Main) (Default)
-	-	-	-	OFF	OFF	OFF	ON	1# (Line-Controlled Sub Machine)
-	-	-	-	OFF	OFF	ON	OFF	2# (Line-Controlled Sub Machine)
-	-	-	-	OFF	OFF	ON	ON	3# (Line-Controlled Sub Machine)
-	-	-	-	-	-	-	-	--
-	-	-	-	ON	ON	ON	ON	15# (Line-Controlled Sub Machine)

SW3_1 The fan selection function in cooling mode is only applicable to duct and slim duct.
SW3_4 Only applicable to slim duct

Jumper Settings - Model Identification

RJ1	RJ2	RJ3	SW3-2	SW3-3	Description
OFF	OFF	OFF	OFF	OFF	Crane
OFF	OFF	OFF	OFF	ON	Cassette With 1 Oscillating Wind
OFF	OFF	OFF	ON	OFF	Cassette With Four-Way Oscillating Wind
OFF	OFF	OFF	ON	ON	Cassette With Light Panel
OFF	OFF	ON	OFF	OFF	Console
OFF	ON	OFF	OFF	OFF	Small Duct
OFF	ON	OFF	OFF	ON	High-Capacity Duct
-	-	-	-	-	Reserve

Suitable for convertible, 2HP cassette (matched with single swing wind), 2HP cassette (matched with four swing wind), 3HP cassette (equipped with display board). For example, if the convertible has 0 0 0 0, the resistance should be welded RJ1/RJ2/RJ3. Simultaneously dial the second digit of code BM3 to OFF and the third digit to OFF. The same setup method is used for other models.

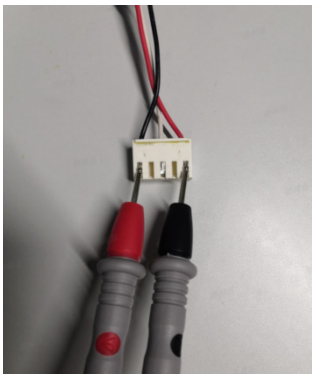
Resistance Values

Model	US09CB2BEA	US12CB2BEA	US18CB2BEA
Fan Motor Resistance Value	0150401754C, 65±7%		

Model	US09CB2BEA	US12CB2BEA	US18CB2BEA
Louver Resistance Value	0150401794A, 300Ω±7% 0150401794B, 300Ω±7%		

Measure the Resistance:

Use a multimeter to measure the resistance between any two phases (U, V, W) of the motor (as shown in the following diagram).



US09FB2BEA
US12FB2BEA
US18FB2BEA

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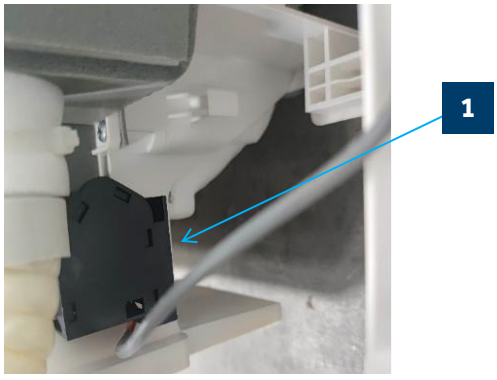
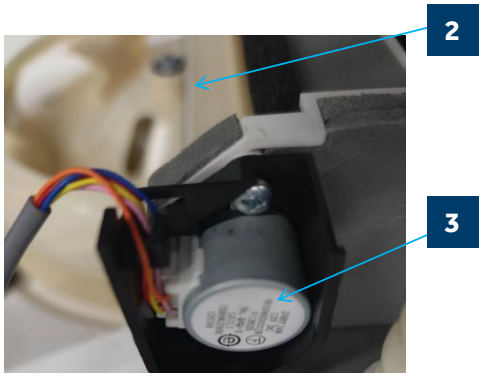
US09FB2BEA / US12FB2BEA / US18FB2BEA





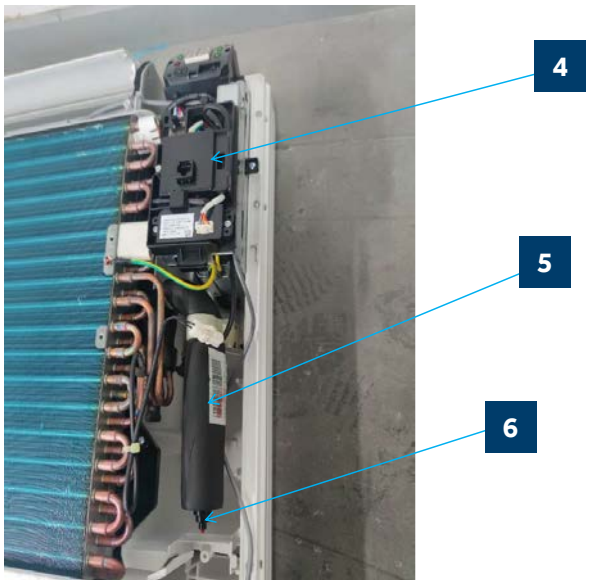
1 Louver Motor

The louver motors are stepper type motors that move the louvers up/down. The motors are controlled by pulsed voltage that cannot be measured. If the louver does not move when it should, check for a bind in the louvers.

2 Flap

3 Step Motor

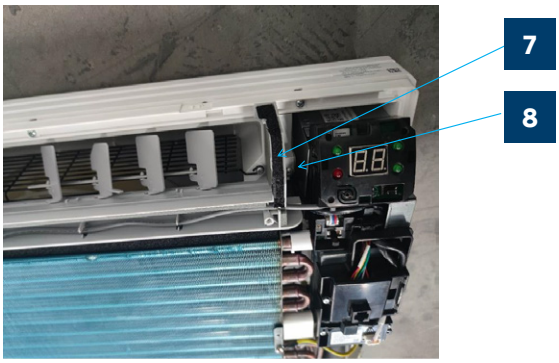
An electric device turning electrical pulses into precise mechanical motions, rotating a fixed angle per pulse, used for accurate control.



4 Electrical Box

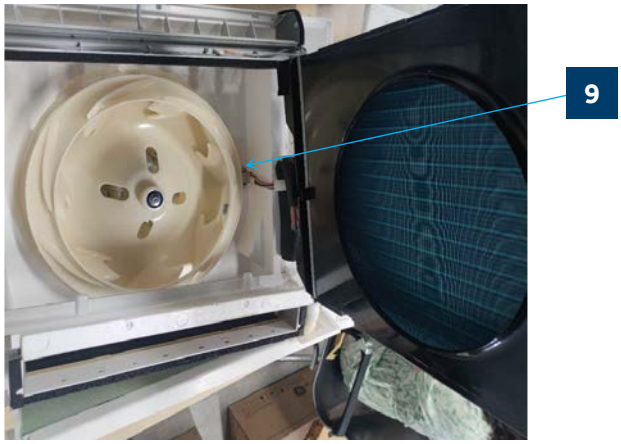
5 Pipe Bushing

6 Joint Connector

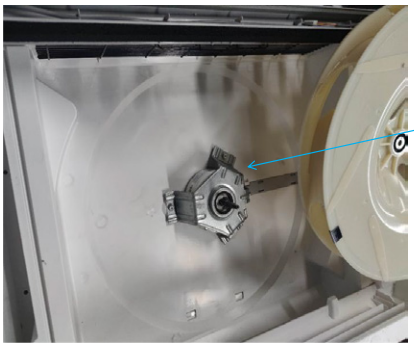


7 Flap

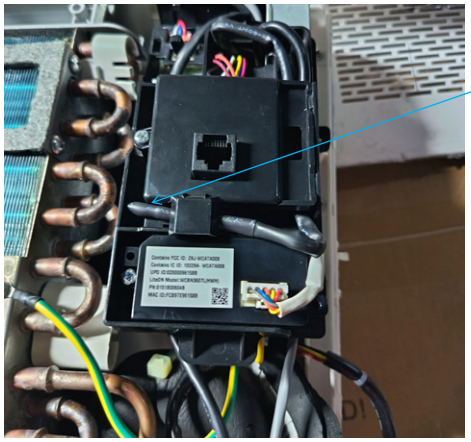
8 Fan Guard



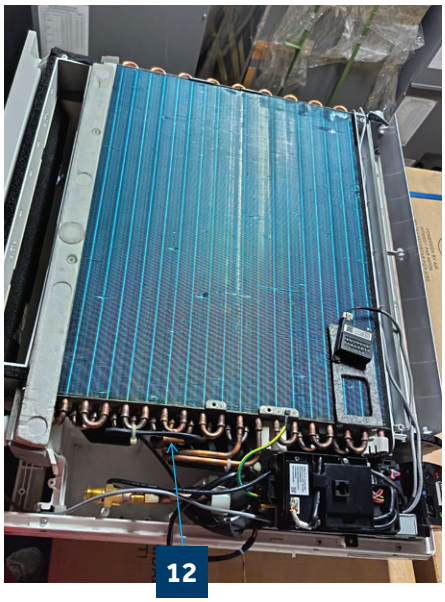
9 Fan Wheel



10 Fan Motor



11 Ambient Air Temperature Sensor



12 Coil Temperature Sensor

COMPONENTS

PCB Overview

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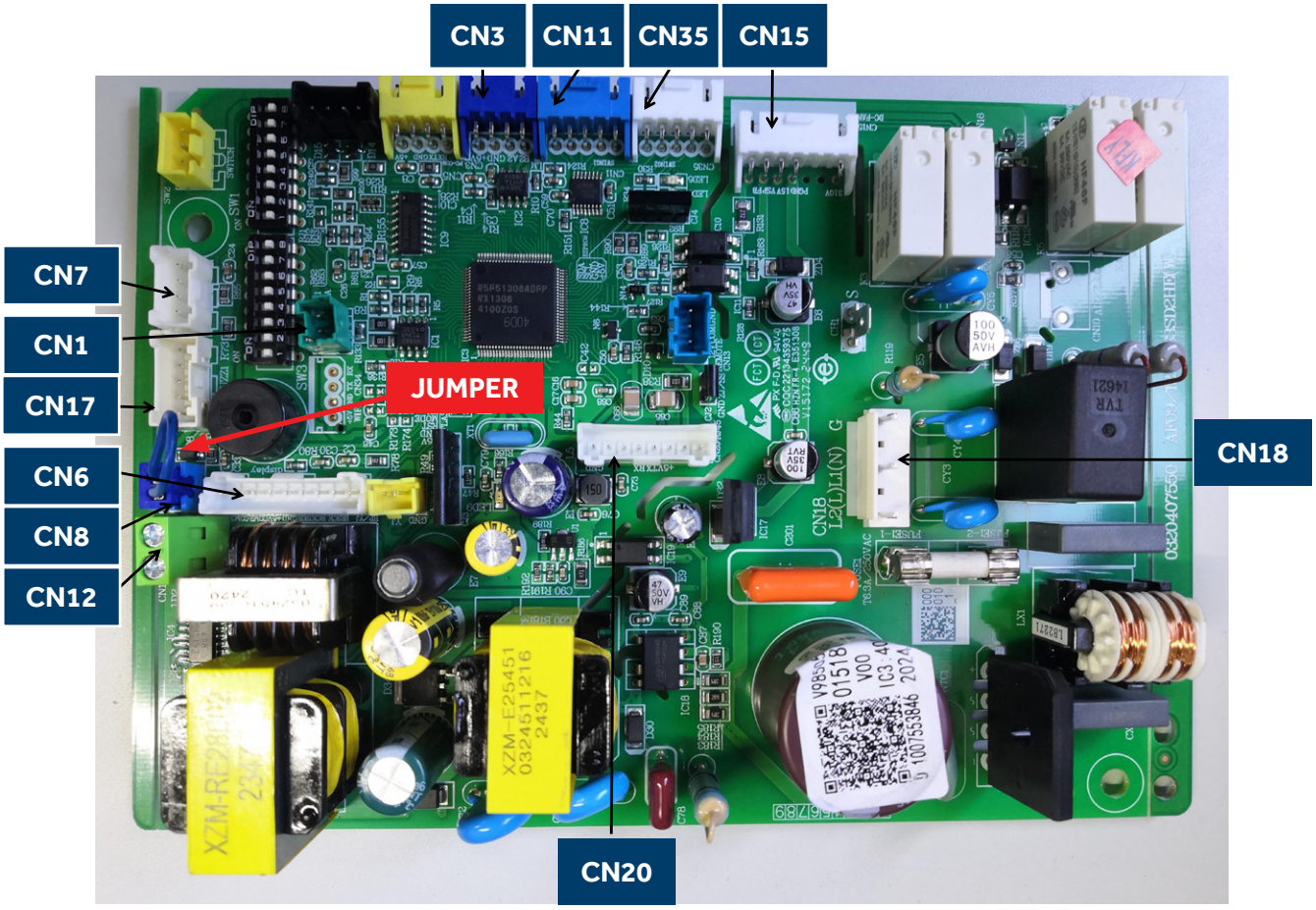
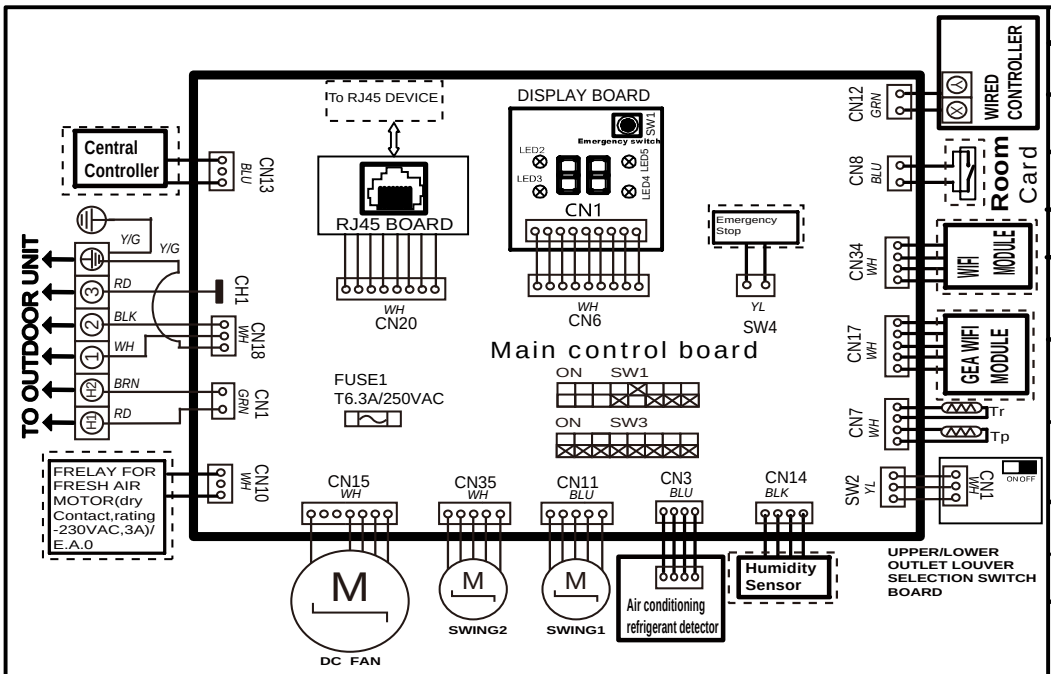
US09FB2BEA / US12FB2BEA / US18FB2BEA



CN1	OTA
CN3	Refrigerant Sensor
CN6	Display Board
CN7	Sensor
CN8	Room Card
CN11	Left and Right Swing
CN12	Wired Controller
CN15	Fan Motor
CN17	WiFi
CN18	Power Supply
CN20	RJ45 Communication CN35 Up-and-Down Swing Motor

US09FB2BEA / US12FB2BEA / US18FB2BEA



Refrigerant Sensors	SW1-5
have	OFF
no	ON

DIP switches factory default setting

SW3-1	SW3-2	SW3-3	SW3-4	SW3-5	SW3-6	SW3-7	SW3-8	All Console default
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	
SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	SW1-7	SW1-8	MODEL
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	US09FB2BEA
ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	US12FB2BEA
OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	US18FB2BEA

0150577395

Note：
1.Dashed parts are optional.
2.Please refer to the technical service manual for detailed explanations of DIP switches.
3.Do not change the DIP switches setting without technical support
4.Abbreviation ： R-red ,B-black,BL-blue,W-white,Y/G-yellow/green, TEMP.-temperature, E.A.O-exrernal alarm output,Tr-indoor unit room temperature sensor ,Tp-indoor unit pipe temperature sensor (coil temperature sensor)

DIP SWITCH & JUMPER SETTINGS

DIP SW1

SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	SW1-7	SW1-8	Description
OFF	OFF	OFF	-	-	-	-	-	09K
ON	OFF	OFF	-	-	-	-	-	12K
OFF	ON	OFF	-	-	-	-	-	18K
-	-	-	OFF	-	-	-	-	Room Card Valid
-	-	-	ON	-	-	-	-	Room Card Invalid
-	-	-	-	OFF	-	-	-	Refrigerant Detector Functional
-	-	-	-	ON	-	-	-	The Refrigerant Detector Invalid
-	-	-	-	-	OFF	-	-	Fresh Air
-	-	-	-	-	ON	-	-	Fault Alarm
-	-	-	-	-	-	OFF	-	None - Filter Alarm Reminder + Refrigeration Fan Stops
-	-	-	-	-	-	ON	-	Filter Alarm Reminder + Refrigeration Fan Does Not Stop
-	-	-	-	-	-	-	OFF	Us Models
-	-	-	-	-	-	-	ON	Non-Us Models

DIP SW3

SW3-1	SW3-2	SW3-3	SW3-4	SW3-5	SW3-6	SW3-7	SW3-8	Description
OFF	-	-	-	-	-	-	-	Special Fresh Air Selection For Duct Unit: Valid
ON	-	-	-	-	-	-	-	Special Fresh Air Selection For Duct Unit: Invalid
-	OFF	-	-	-	-	-	-	Cassette Single Swing Wind - Synchronized Swing Of Swing Blades
-	ON	-	-	-	-	-	-	Cassette Unit Four Swing Wind - Four Swing Blades Swing At Different Angles, Misaligned Swing
-	-	OFF	-	-	-	-	-	Electrical Heating: Invalid
-	-	ON	-	-	-	-	-	Electrical Heating: Valid
-	-	-	OFF	-	-	-	-	Model: Ultra-Slim Ducted Unit With 4-Level Static Pressure
-	-	-	ON	-	-	-	-	Model: Medium Static Pressure Duct With 10-Level Static Pressure Adjustment
-	-	-	-	OFF	OFF	OFF	OFF	0# (Wired Control Main) (Default)
-	-	-	-	OFF	OFF	OFF	ON	1# (Line-Controlled Sub Machine)
-	-	-	-	OFF	OFF	ON	OFF	2# (Line-Controlled Sub Machine)
-	-	-	-	OFF	OFF	ON	ON	3# (Line-Controlled Sub Machine)
-	-	-	-	-	-	-	-	--
-	-	-	-	ON	ON	ON	ON	15# (Line-Controlled Sub Machine)

SW3_1 The fan selection function in cooling mode is only applicable to duct and slim duct.
SW3_4 Only applicable to slim duct

Jumper Settings - Model Identification

RJ1	RJ2	RJ3	SW3-2	SW3-3	Description
OFF	OFF	OFF	OFF	OFF	Crane
OFF	OFF	OFF	OFF	ON	Cassette With 1 Oscillating Wind
OFF	OFF	OFF	ON	OFF	Cassette With Four-Way Oscillating Wind
OFF	OFF	OFF	ON	ON	Cassette With Light Panel
OFF	OFF	ON	OFF	OFF	Console
OFF	ON	OFF	OFF	OFF	Small Duct
OFF	ON	OFF	OFF	ON	High-Capacity Duct
-	-	-	-	-	Reserve

Suitable for convertible, 2HP cassette (matched with single swing wind), 2HP cassette (matched with four swing wind), 3HP cassette (equipped with display board). For example, if the convertible has 0 0 0 0, the resistance should be welded RJ1/RJ2/RJ3. Simultaneously dial the second digit of code BM3 to OFF and the third digit to OFF. The same setup method is used for other models.

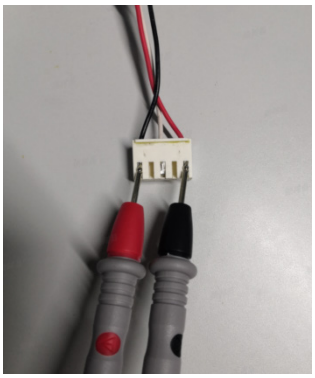
Resistance Values

Model	US09FB2BEA	US12FB2BEA	US18FB2BEA
Fan Motor Resistance Value	0150402538, 107Ω±10%		

Model	US09FB2BEA	US12FB2BEA	US18FB2BEA
Louver Resistance Value	0010402433KA, 300Ω±7%		

Measure the Resistance:

Use a multimeter to measure the resistance between any two phases (U, V, W) of the motor (as shown in the following diagram).



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US09MB2BEA
US12MB2BEA
US18MB2BEA

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COMPONENTS

US09MB2BEA / US12MB2BEA / US18MB2BEA

1 Evaporator Coil

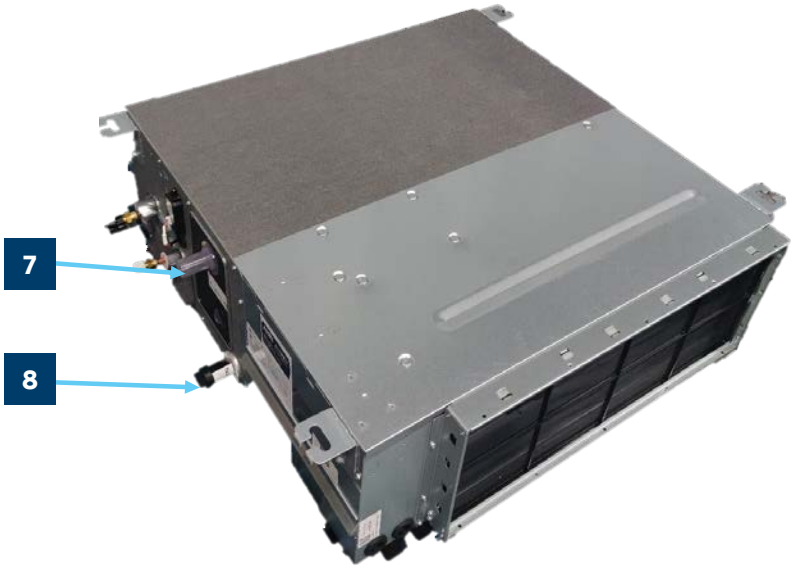
2 Blower Assembly

The indoor unit features a DC variable speed blower motor that will change speed to match the capacity demand from the outdoor unit. The motor powers blower assembly.

The blower assembly consists of 2 plastic blowers. A set screw holds each blower wheel to the blower motor.

The indoor blower motor is connected to the indoor unit control board. The wiring from the motor to indoor board consists of 3 wires connected to pins that deliver line voltage.

During normal operation, the indoor control board will energize the indoor blower motor and request proper speed.

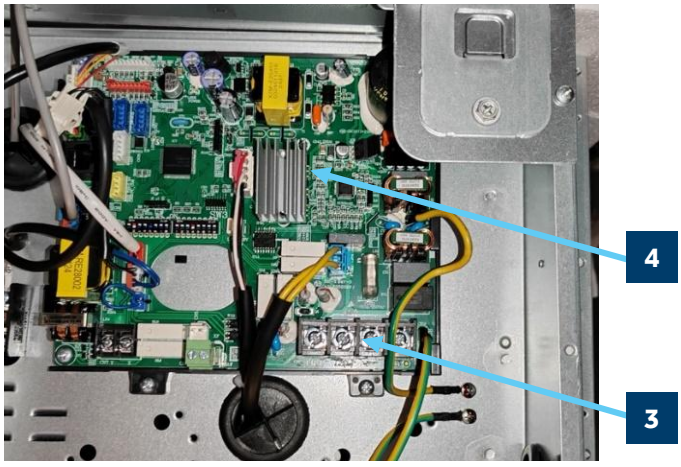


3 Terminal Block

Power to operate the indoor unit comes from the electrical line voltage terminal block at the outdoor unit. The wiring includes 4 wires, 1, 2, S and ground. Wires 1 and S complete the data path. These wires should always be 14 gauge AWG stranded cooper, non-shielded type wire. Splices in wires 1 or S may cause communication errors.

4 Control Board

Located under the electrical control box cover.



5 Ambient Temperature Sensor

The Ambient Temperature Sensor senses room temperature. This sensor provides room temperature information to the ECU for calculation of inverter capacity and temperature control. Both sensors are negative temperature coefficient type that reduce electrical resistance as temperature rises.

6 Piping Temperature Sensor

The Piping Temperature Sensor senses indoor coil temperature in the cooling mode and in the heating mode. This sensor is used for Anti Freezing and Anti Cold Blow cycles. The sensor also provides critical temperature information to the ECU that may be used in frequency adjustments.

7 Condensate Pump

The Duct unit has a built-in condensate pump. The pump is connected to the circuit board. The pump is energized whenever the Float Switch indicates that water needs to be pumped from the cassette. The float switch connects onto the circuit board.

The float switch and pump are located behind the removable insulated cover next to the electrical control box. The pump is hermetically sealed and requires no maintenance. The float switch is a normally closed switch, that opens as water rises. The float switch requires no maintenance.

8 Gravity Drain Ports

The indoor units have the option for either gravity drain systems or the use of an internal condensate pump with float switch. If high lift is required, the water from the duct unit should be pumped to a field condensate pump that is capable of high lift.

Note: If the Internal condensate pump is not used (only gravity drain), the condensate pump must be disconnected from the PCB (CN4).

PCB Overview

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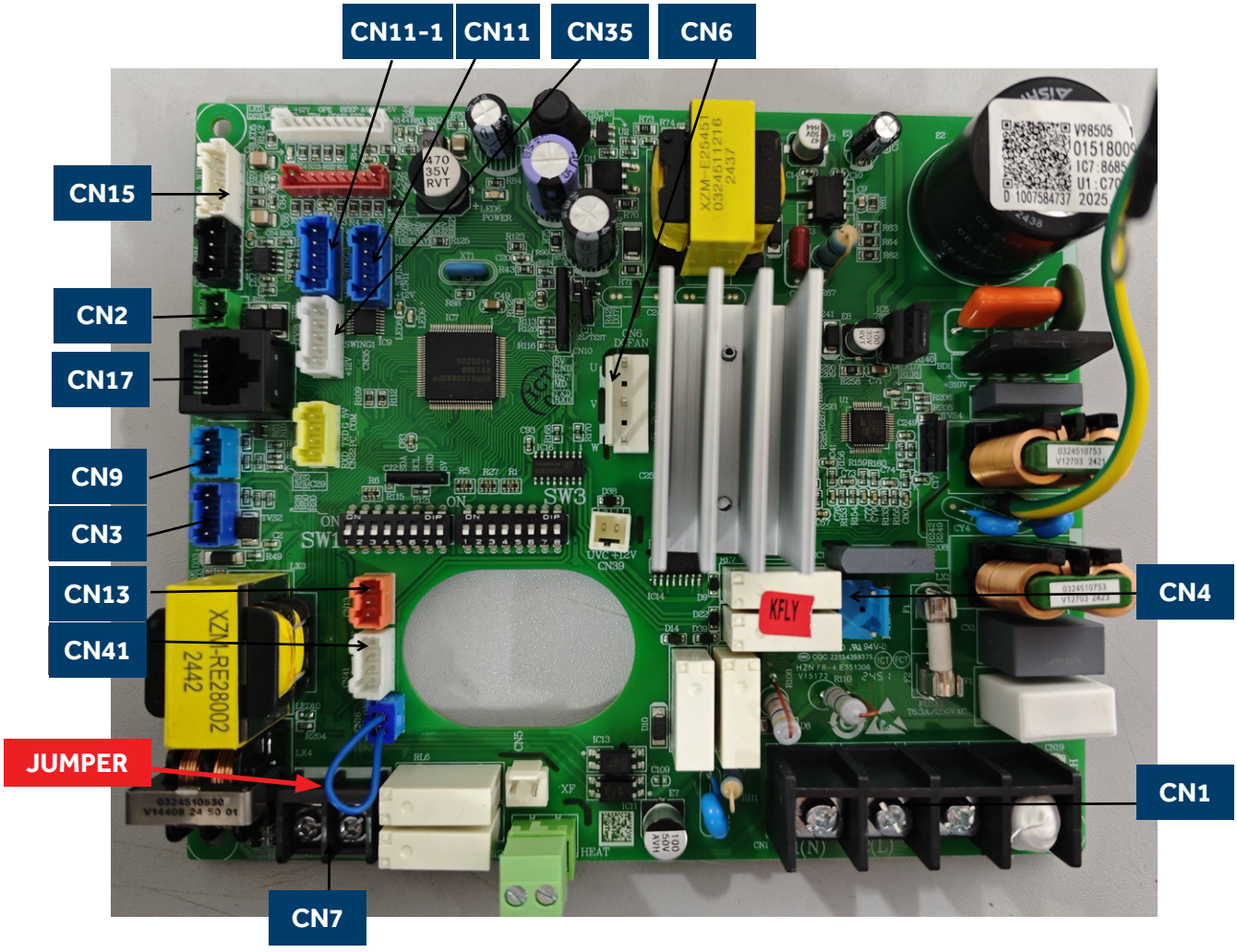
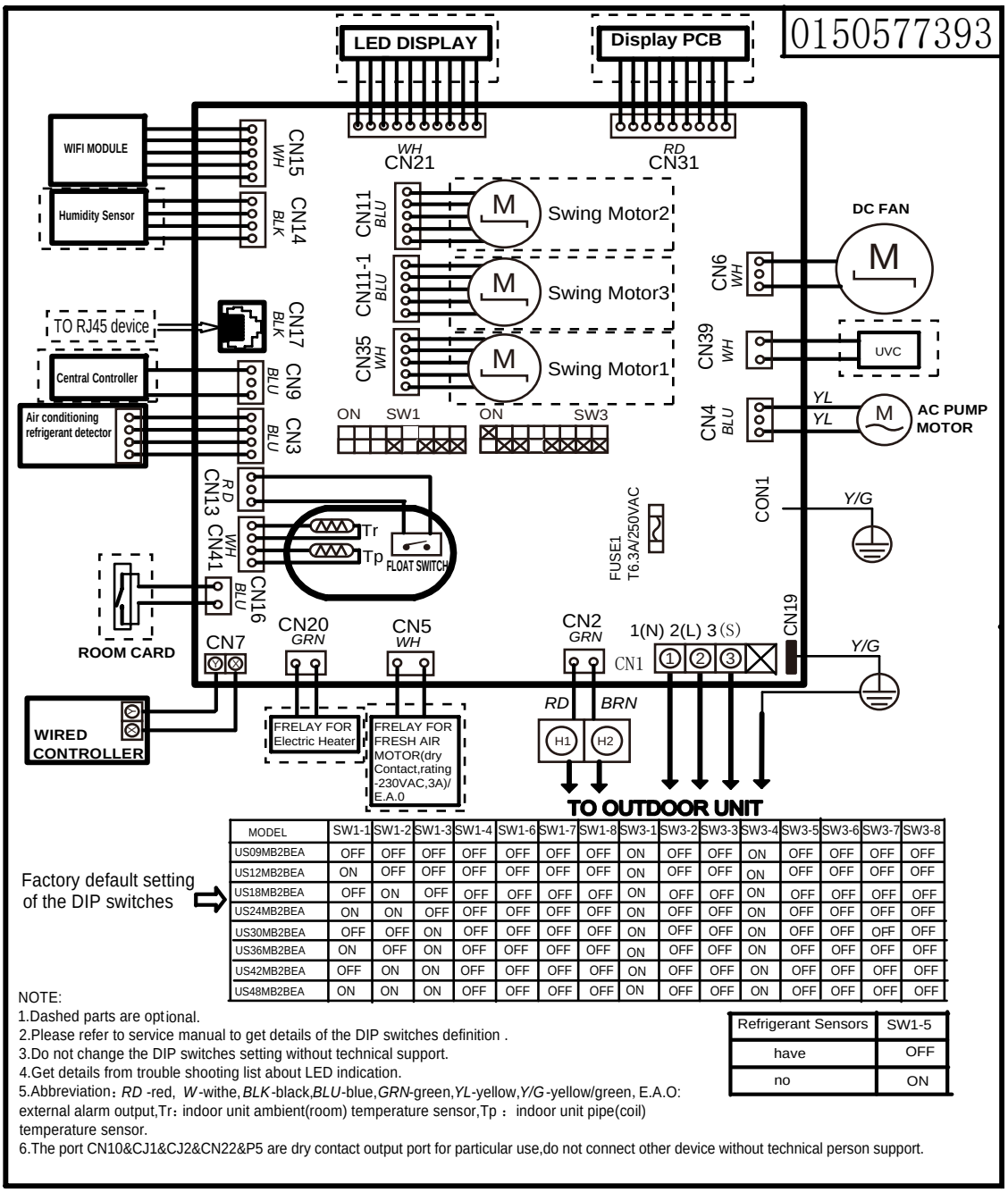
US09MB2BEA / US12MB2BEA / US18MB2BEA



CN1	Power Supply	CN7	Wired Controller	CN17	RJ45 Communication
CN2	OTA	CN9	Remote Communication	CN35	Left and Right Swing
CN3	Refrigerant Sensor	CN11-1	Up-and-Down Swing	CN41	Sensor
CN4	Drain Pump	CN13	Float Switch		
CN6	Fan Motor	CN15	WiFi		

US09MB2BEA / US12MB2BEA / US18MB2BEA



Factory default setting of the DIP switches

MODEL	SW1-1	SW1-2	SW1-3	SW1-4	SW1-6	SW1-7	SW1-8	SW3-1	SW3-2	SW3-3	SW3-4	SW3-5	SW3-6	SW3-7	SW3-8
US09MB2BEA	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
US12MB2BEA	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
US18MB2BEA	OFF	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
US24MB2BEA	ON	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
US30MB2BEA	OFF	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
US36MB2BEA	ON	OFF	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
US42MB2BEA	OFF	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
US48MB2BEA	ON	ON	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF

Refrigerant Sensors	SW1-5
have	OFF
no	ON

NOTE:
1.Dashed parts are optional.
2.Please refer to service manual to get details of the DIP switches definition .
3.Do not change the DIP switches setting without technical support.
4.Get details from trouble shooting list about LED indication.
5.Abbreviation：*RD* -red, *W*-withe,*BLK*-black,*BLU*-blue,*GRN*-green,*YL*-yellow,*Y/G*-yellow/green, E.A.O: external alarm output,Tr：indoor unit ambient(room) temperature sensor,Tp ： indoor unit pipe(coil) temperature sensor.
6.The port CN10&CJ1&CJ2&CN22&P5 are dry contact output port for particular use,do not connect other device without technical person support.

DIP SW1

SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6	SW1-7	SW1-8	Description
OFF	OFF	OFF	-	-	-	-	-	09K
ON	OFF	OFF	-	-	-	-	-	12K
OFF	ON	OFF	-	-	-	-	-	18K
-	-	-	OFF	-	-	-	-	Room Card Valid
-	-	-	ON	-	-	-	-	Room Card Invalid
-	-	-	-	OFF	-	-	-	Refrigerant Detector Functional
-	-	-	-	ON	-	-	-	The Refrigerant Detector Invalid
-	-	-	-	-	OFF	-	-	Fresh Air
-	-	-	-	-	ON	-	-	Fault Alarm
-	-	-	-	-	-	OFF	-	None - Filter Alarm Reminder + Refrigeration Fan Stops
-	-	-	-	-	-	ON	-	Filter Alarm Reminder + Refrigeration Fan Does Not Stop
-	-	-	-	-	-	-	OFF	Us Models
-	-	-	-	-	-	-	ON	Non-Us Models

DIP SW3

SW3-1	SW3-2	SW3-3	SW3-4	SW3-5	SW3-6	SW3-7	SW3-8	Description
OFF	-	-	-	-	-	-	-	Special Fresh Air Selection For Duct Unit: Valid
ON	-	-	-	-	-	-	-	Special Fresh Air Selection For Duct Unit: Invalid
-	OFF	-	-	-	-	-	-	Cassette Single Swing Wind - Synchronized Swing Of Swing Blades
-	ON	-	-	-	-	-	-	Cassette Unit Four Swing Wind - Four Swing Blades Swing At Different Angles, Misaligned Swing
-	-	OFF	-	-	-	-	-	Electrical Heating: Invalid
-	-	ON	-	-	-	-	-	Electrical Heating: Valid
-	-	-	OFF	-	-	-	-	Model: Ultra-Slim Ducted Unit With 4-Level Static Pressure
-	-	-	ON	-	-	-	-	Model: Medium Static Pressure Duct With 10-Level Static Pressure Adjustment
-	-	-	-	OFF	OFF	OFF	OFF	0# (Wired Control Main) (Default)
-	-	-	-	OFF	OFF	OFF	ON	1# (Line-Controlled Sub Machine)
-	-	-	-	OFF	OFF	ON	OFF	2# (Line-Controlled Sub Machine)
-	-	-	-	OFF	OFF	ON	ON	3# (Line-Controlled Sub Machine)
-	-	-	-	-	-	-	-	--
-	-	-	-	ON	ON	ON	ON	15# (Line-Controlled Sub Machine)

SW3_1 The fan selection function in cooling mode is only applicable to duct and slim duct.
SW3_4 Only applicable to slim duct

Jumper Settings - Model Identification

RJ1	RJ2	RJ3	SW3-2	SW3-3	Description
OFF	OFF	OFF	OFF	OFF	Crane
OFF	OFF	OFF	OFF	ON	Cassette With 1 Oscillating Wind
OFF	OFF	OFF	ON	OFF	Cassette With Four-Way Oscillating Wind
OFF	OFF	OFF	ON	ON	Cassette With Light Panel
OFF	OFF	ON	OFF	OFF	Console
OFF	ON	OFF	OFF	OFF	Small Duct
OFF	ON	OFF	OFF	ON	High-Capacity Duct
-	-	-	-	-	Reserve

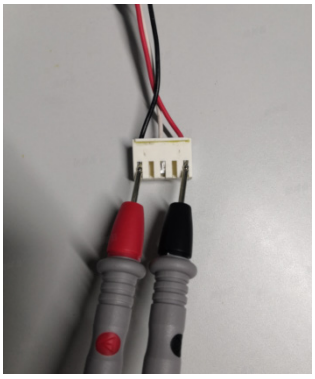
Suitable for convertible, 2HP cassette (matched with single swing wind), 2HP cassette (matched with four swing wind), 3HP cassette (equipped with display board). For example, if the convertible has 0 0 0 0, the resistance should be welded RJ1/RJ2/RJ3. Simultaneously dial the second digit of code BM3 to OFF and the third digit to OFF. The same setup method is used for other models.

Resistance Values

Model	US09CB2BEA	US12CB2BEA	US18CB2BEA
Fan Motor Resistance Value	0150401249C, 20.6±7%		0150402221C, 12.5±7%

Measure the Resistance:

Use a multimeter to measure the resistance between any two phases (U, V, W) of the motor (as shown in the following diagram).



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ERROR CODES

1G09ED2BEA/GS09WP2BEA, 1G12ED2BEA/GS12WP2BEA, 1G18ED2BEA/GS18WP2BEA

OUTDOOR UNITS	FAULT DESCRIPTION	INDOOR UNIT
LED DISPLAY		DIGITAL DISPLAY
/	INDOOR AMBIENT TEMPERATURE SENSOR FAILURE	E1
/	INDOOR COIL TEMPERATURE SENSOR FAILURE	E2
/	INDOOR PCB EEPROM FAILURE	E4
15	COMMUNICATION FAILURE BETWEEN THE INDOOR & OUTDOOR UNIT	E7
/	INDOOR FAN MOTOR MALFUNCTION	E14
21	IDU ANTI-FROSTING PROTECTION (COOLING MODE ONLY)	/
21	INDOOR UNIT OVERLOAD PROTECTION, HEATING MODE ONLY.	/
28	LACK OF REFRIGERANT OR DISCHARGING	/
1	OUTDOOR EEPROM FAILURE	F12
2	IPM OVERCURRENT OR SHORT CIRCUIT	F1
3	OUTDOOR ALTERNATING CURRENT, OVER CURRENT PROTECTION	F22
5	MODULE OPERATED OVERLOAD (COMPRESSOR OVERLOAD PROTECTION)	F20
6	MODULE LOW OR HIGH VOLTAGE	F19
7	COMPRESSOR CURRENT SAMPLING CIRCUIT FAULT	F27
8	OVERHEAT PROTECTION FOR DISCHARGE TEMPERATURE	F4
9	MALFUNCTION OF THE DC FAN MOTOR	F8
10	MALFUNCTION OF DEFROST TEMPERATURE SENSOR	F21
12	AMBIENT TEMPERATURE SENSOR FAILURE	F6
13	DISCHARGE TEMPERATURE SENSOR FAILURE	F25
24	COMPRESSOR START FAILURE, OVER-CURRENT	F2
25	PHASE CURRENT PROTECTION (IPM)	F23
/	REFRIGERANT LEAK FAULT >10% LFL	AA
/	REFRIGERANT LEAK FAULT <8% LFL	Ab
/	LEAK SENSOR COMMUNICATION FAULT	Ac
/	LEAKAGE SENSOR SELF-CHECK FAULT - SELF CHECK FAULT	Ad
/	SENSOR REACHING END OF LIFE WARNING	AE
/	SENSOR REACHING END OF LIFE	AF
/	DIP SWITCH ENABLED, NO SENSOR DETECTED	bA

US09FB2BEA / US12FB2BEA / US18FB2BEA

PANEL DISPLAY	WIRED CONTROLLER DISPLAY (YR-E17)	DESCRIPTION	POSSIBLE CAUSES
E1	01	INDOOR UNIT AMBIENT TEMPERATURE SENSOR MALFUNCTION	SENSOR DISCONNECTED,OR BROK EN,OR AT WRONG POSITION,OR SHORT CIRCUIT
E2	02	INDOOR UNIT PIPING TEMPERATURE SENSOR MALFUNCTION	SENSOR DISCONNECTED,OR B ,KEN,OR AT WRONG POSITION OR SHORT CIRCUIT
E4	04	INDOOR PCB EEPROM WRONG	EEPROM CHIP DISCONNECTED OR BROKEN OR WRONG PROGRAM- MED OR PCB BROKEN
E7	07	ABNORMAL COMMUNICATION BETWEEN INDOOR AND OUTDOOR UNITS	WRONG CONNECTION, WIRES DISCONNECTED, WRONG ADDRESS SETTING OF INDOOR UNIT, FAULTY POWER SUPPLY, OR FAULTY PCB
EB	07 FLASHING ON THE UPPER RIGHT CORNER	ABNORMAL COMMUNICATION BETWEEN WIRED CONTROLLER AND INDOOR UNIT	WRONG CONNECTION, WIRED CONTROLLER BROKEN, OR PCB FAULTY.
E12	0C	DRAIN SYSTEM MALFUNCTION	PUMP MOTOR DISCONNECTED OR AT WRONG POSITION,FLOAT SWITCH DISCONNECTED, WRONG POSITION, OR SHORT CIRCUIT BRIDGE DISCONNECTED
E13	0D	ZERO CROSS SIGNAL WRONG	ZERO CROSS SIGNAL DETECTED WRONG.
E14	0E	INDOOR UNIT DC FAN MOTOR ABNORMAL	DC FAN MOTOR DISCONNECTED, FAN BROKEN, OR CIRCUIT BROKEN
F1-- F45	OUTDOOR ERROR CODE+20 CORRESPOND HEX CODE	OUTDOOR UNIT ERROR	SEE CORRESPOND OUTDOOR UNIT ERROR TROUBLE SHOOTING. REMARK: F1 MEANS OUTDOOR ERROR CODE 1, F2 MEANS OUTDOOR ERROR CODE 2, AND SO ON.

ERROR CODES

US09CB2BEA / US12CB2BEA / US18CB2BEA / US24LB2BEA / US30LB2BEA / US36LB2BEA

US09MB2BEA / US12MB2BEA / US18MB2BEA / US24MB2BEA / US30MB2BEA / US36MB2BEA

LED2 FLASH TIMES		PANEL DISPLAY	WIRED CONTROLLER DISPLAY	DESCRIPTION	POSSIBLE CAUSES
TENS PLACE	ONES PLACE				
0	1	E1	1	INDOOR UNIT AMBIENT TEMPERATURE SENSOR MALFUNCTION	SENSOR DISCONNECTED, BROKEN, AT WRONG POSITION, OR SHORT CIRCUIT.
0	2	E2	2	INDOOR UNIT PIPING TEMPERATURE SENSOR MALFUNCTION	SENSOR DISCONNECTED, BROKEN, AT WRONG POSITION, OR SHORT CIRCUIT.
0	4	E4	4	INDOOR PCB EEPROM WRONG	EEPROM CHIP DISCONNECTED, BROKEN, WRONG PROGRAMMED, OR PCB BROKEN.
0	7	E7	7	ABNORMAL COMMUNICATION BETWEEN INDOOR AND OUTDOOR UNITS	WRONG CONNECTION, WIRES DISCONNECTED, WRONG ADDRESS SETTING OF INDOOR UNIT, FAULTY POWER SUPPLY, OR FAULTY PCB
0	8	E8	07 FLASHING ON THE UPPER RIGHT CORNER	ABNORMAL COMMUNICATION BETWEEN WIRED CONTROLLER AND INDOOR UNIT	WRONG CONNECTION, WIRED CONTROLLER BROKEN, OR PCB FAULTY.
0	12	E12	0C	DRAIN SYSTEM MALFUNCTION	PUMP MOTOR DISCONNECTED OR AT WRONG POSITION,FLOAT SWITCH DISCONNECTED, WRONG POSITION, OR SHORT CIRCUIT BRIDGE DISCONNECTED
0	13	E13	0D	ZERO CROSS SIGNAL WRONG	ZERO CROSS SIGNAL DETECTED WRONG.
0	14	E14	0E	INDOOR UNIT DC FAN MOTOR ABNORMAL	DC FAN MOTOR DISCONNECTED, FAN BROKEN, OR CIRCUIT BROKEN
M(≥2)	N(≥0)	F1-F45	OUTDOOR ERROR CODE +20 CORRESPOND HEX CODE	OUTDOOR UNIT ERROR	SEE CORRESPOND OUTDOOR UNIT ERROR TROUBLESHOOTING. REMARK: F1 MEANS OUTDOOR ERROR CODE 1, F2 MEANS OUTDOOR ERROR CODE 2, AND SO ON.
18	6	bA	BA	THE REFRIGERANT DETECTOR IS NOT INSTALLED	NO REFRIGERANT DETECTOR IS INSTALLED
17	0	AA	AA	REFRIGERANT LEAKAGE	FAULT "AA" CANNOT BE CLEARED. ONLY THE LEAKAGE CONCENTRATION DECREASES AND THE FAULT IS TURNED TO "AB". SEE THE TECHNICAL MANUAL FOR ELIMINATION
17	2	Ac	AC	THE COMMUNICATION OF THE REFRIGERANT SENSOR IS FAULTY	WHEN THE AIR CONDITIONER IS RUNNING, THE CABLE HARNESS OF THE REFRIGERANT SENSOR FALLS OFF.
17	3	Ad	AD	THE REFRIGERANT SENSOR SELF CHECK IS FAULTY	THE REFRIGERANT SENSOR IS FAULTY.
17	4	AE	AE	REFRIGERANT SENSOR LIFE THRESHOLD	REFRIGERANT SENSOR LIFE THRESHOLD REMINDER
17	5	AF	AF	THE REFRIGERANT SENSOR EXPIRES	REFRIGERANT SENSOR LIFE THRESHOLD, NEED TO BE REPLACED

Note:

1. For more details about the outdoor unit failure, please refer to the outdoor unit troubleshooting list.
2. SW1-5 OFF: Start the refrigerant sensor function. SW1-5 ON: Disable the refrigerant sensor function.

Error Codes (Indoor/Outdoor)

E1/LED1: No Flash

Room Temperature Sensor Failure

E2/LED1: No Flash

Indoor Coil Temperature Sensor Failure

F21/LED1: 10 Flash

Defrost Temperature Sensor Failure

F25/LED1: 13 Flash

Discharge Temperature Sensor Failure

F6/LED1: 12 Flash

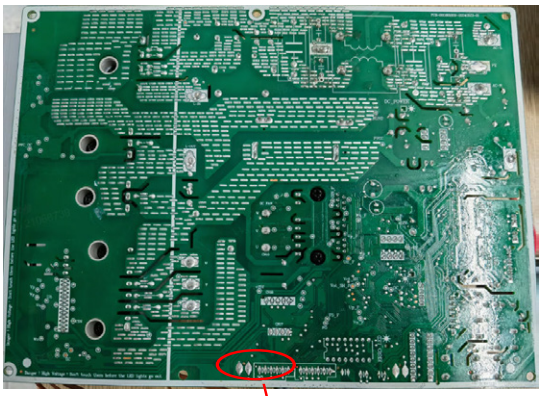
Ambient Temperature Sensor Failure

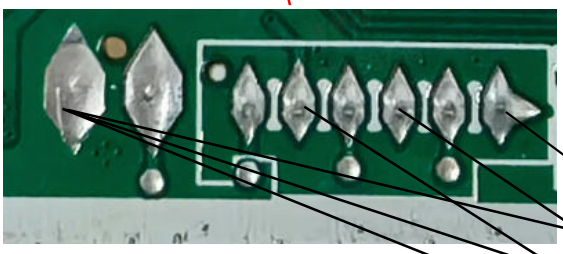
Detection Conditions:

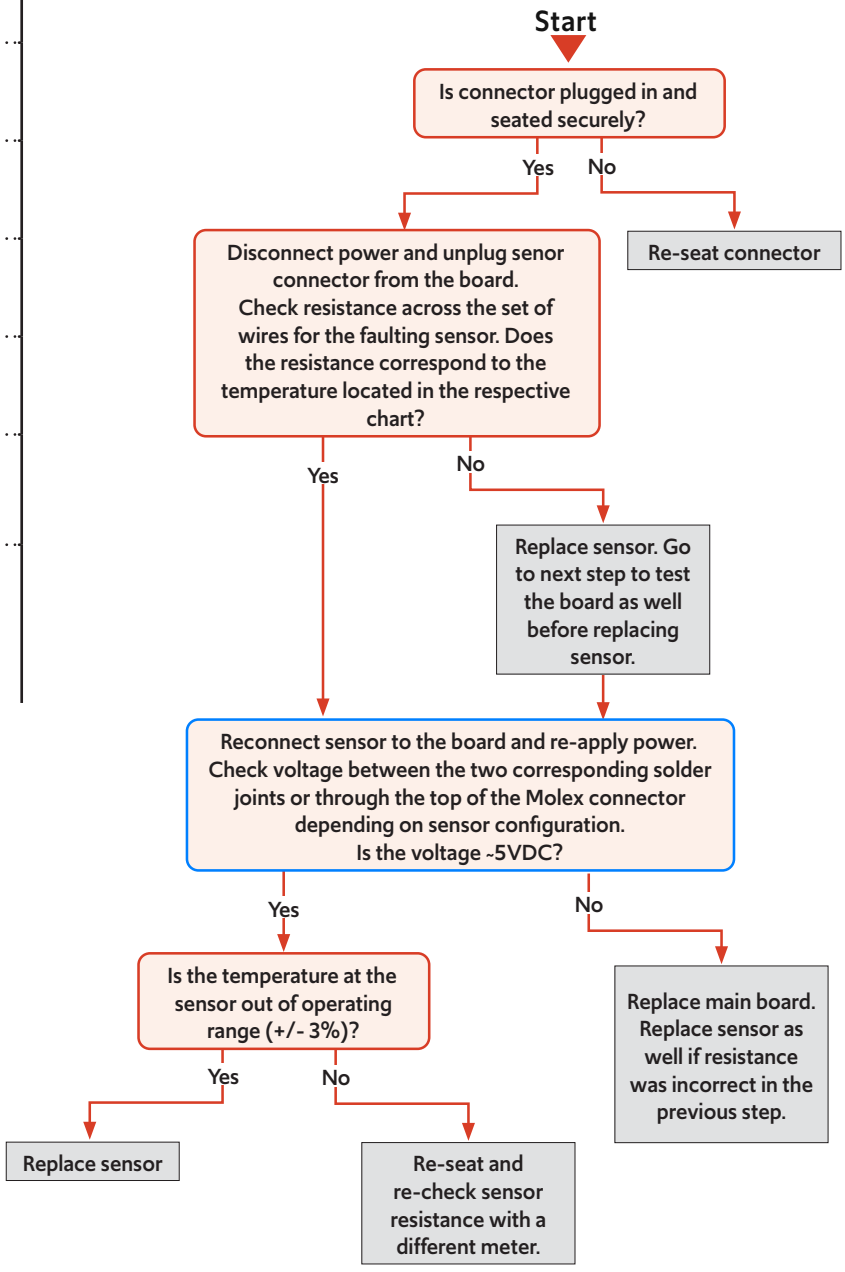
Thermistor input is more than 4.92V or less than 0.08V during compressor operation.

Possible Causes:

- *Faulty connector connection*
- *Faulty thermistor*
- *Faulty PCB*







5V Discharge Temperature Sensor

5V Defrost Temperature Sensor

5V Ambient Temperature Sensor

Error Codes (Indoor/Outdoor)

E4

Indoor EEPROM Error

F12/ LED1: 1 Flash

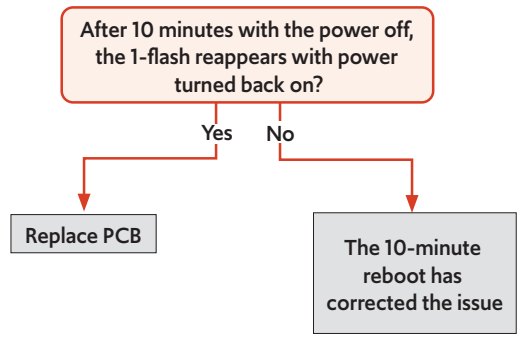
Outdoor EEPROM Error

Detection Conditions:

EEPROM data error or the EEPROM is damaged

Possible Causes:

- *Faulty EEPROM data*
- *Faulty EEPROM*
- *Faulty PCB*



Error Codes (Indoor/Outdoor)

F20/LED1: 5 Flash

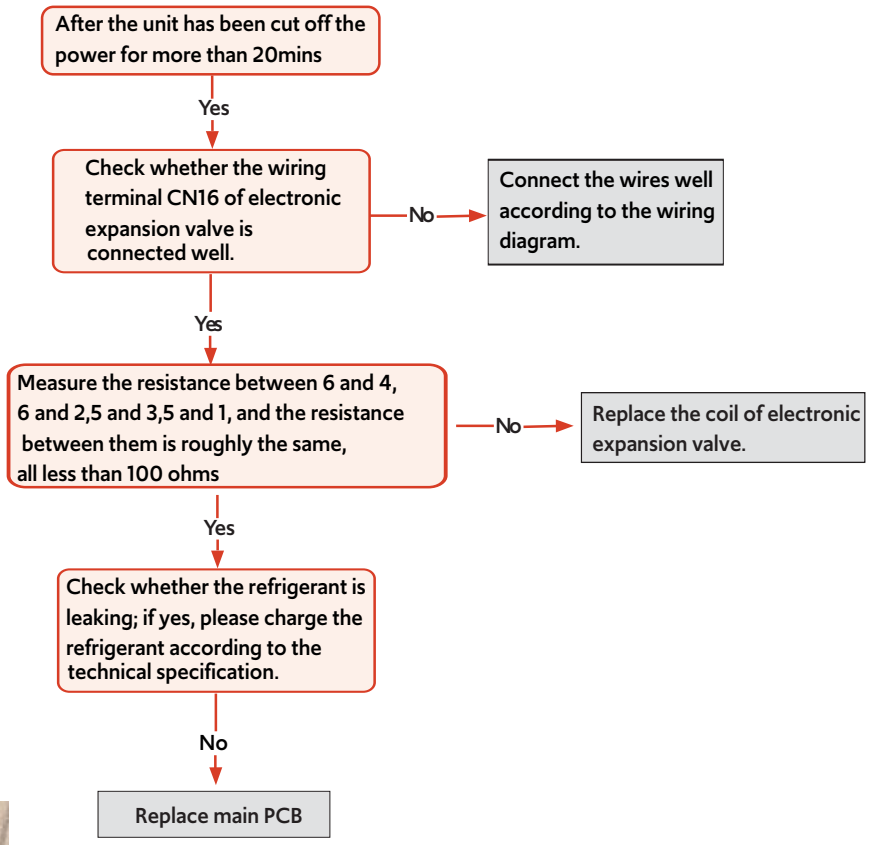
Module operated overload (compressor overload protection)

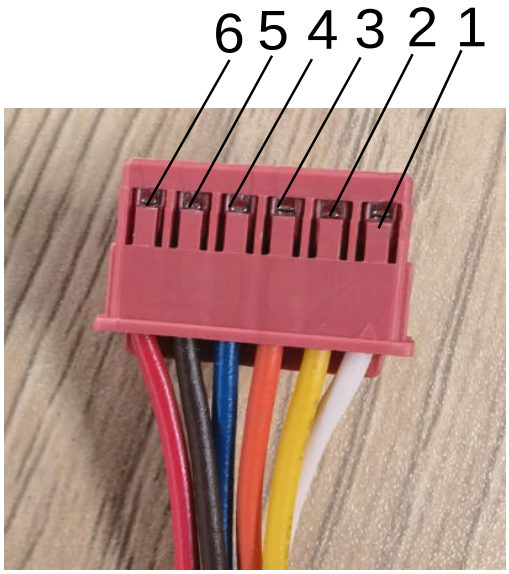
Detection Conditions:

Measure the resistance between 6 and 4,6 and 2,5 and 3,5 and 1, and the resistance, between them is roughly the same, all less than 100 ohms.

Possible Causes:

- *Electronic Expansion Value is bad*
- *Electronic Expansion Value terminal is bad*
- *Lack of refrigerant*





Error Code (Indoor)

E14

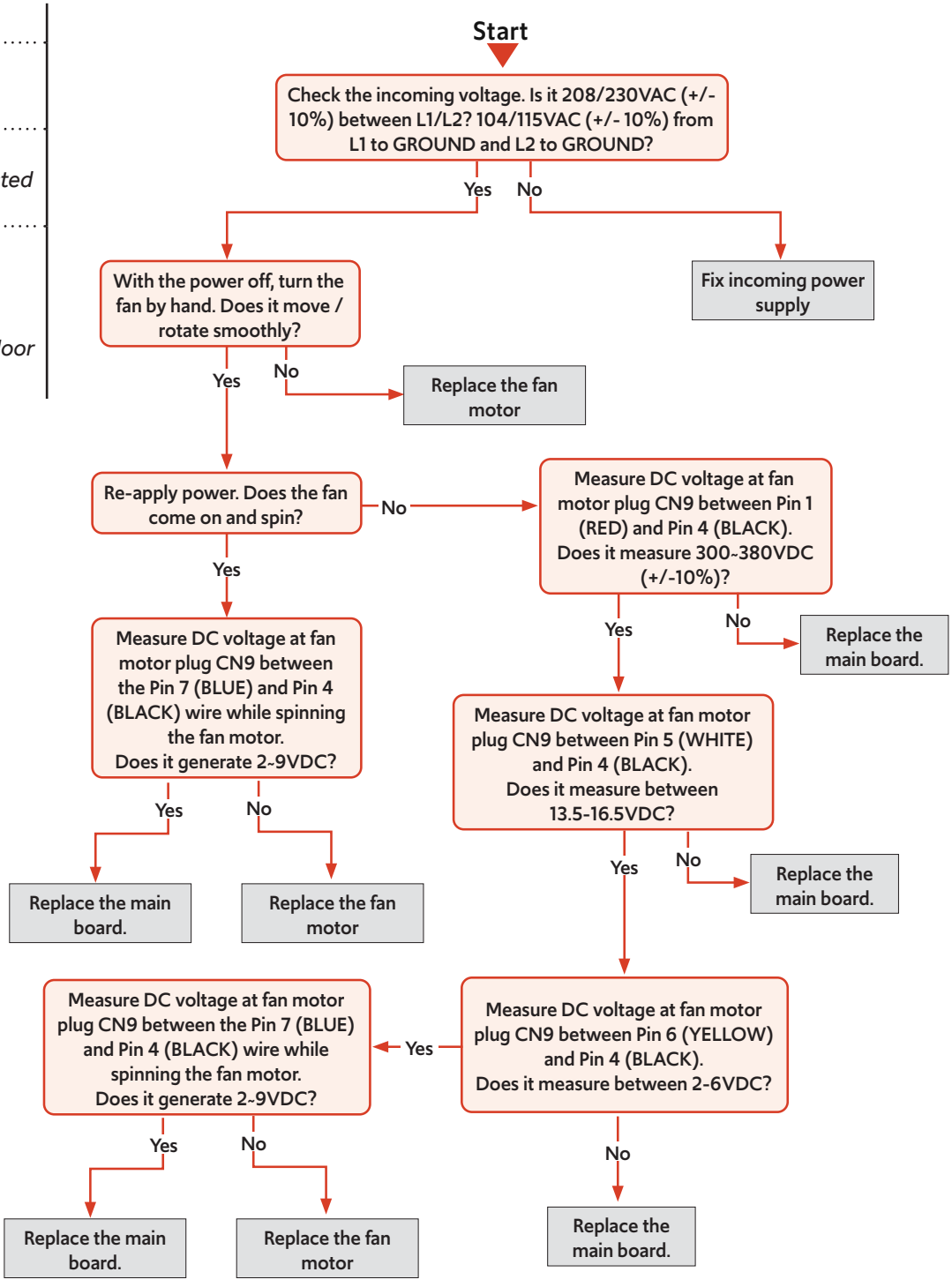
Indoor Fan Motor Failure

Detection Conditions:

No rotation feedback signal detected for 2 minutes

Possible Causes:

- *Faulty fan motor*
- *Fan motor overheat protection*
- *Detection error due to faulty indoor unit PCB*



Error Codes (Indoor/Outdoor)

F1/LED1: 2 Flash

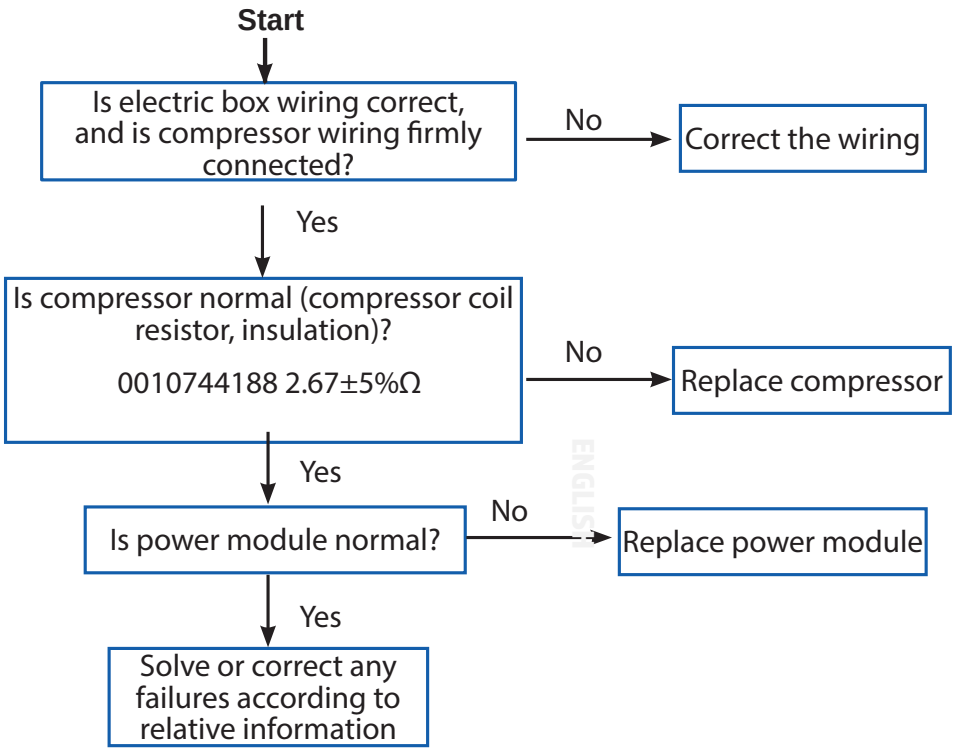
IPM Power Module Failure (PM power module protection)

Detection Conditions:

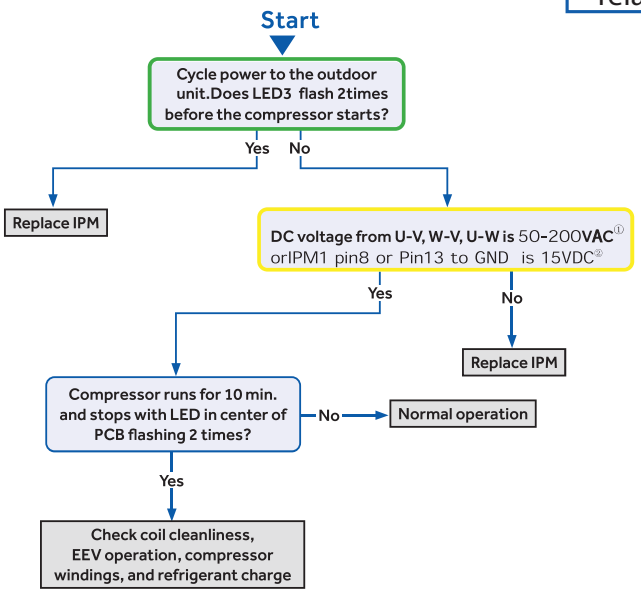
Amp limit hot 3 times in 30 minutes

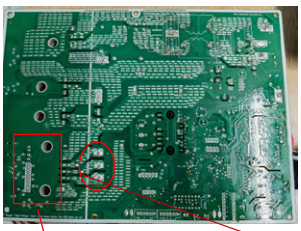
Possible Causes:

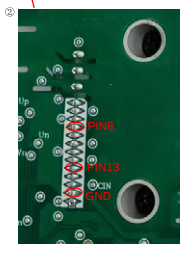
- *IPM bad*
- *Loose compressor wire*
- *Bad compressor*

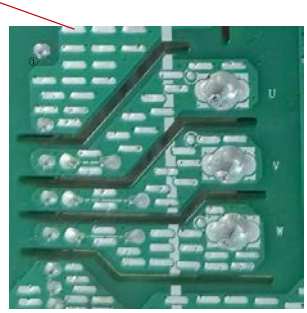


IPM Detect Process Below:

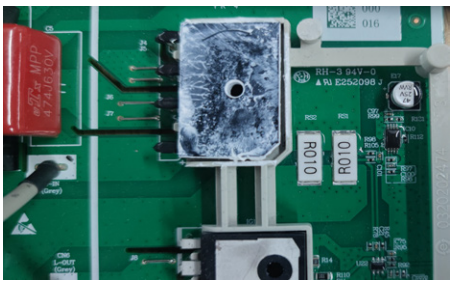








Trigger condition:
The abnormal resistance value of R010 was collected, resulting F1 fault occures.



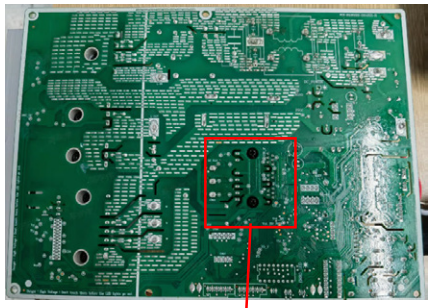
Error Codes (Indoor/Outdoor)

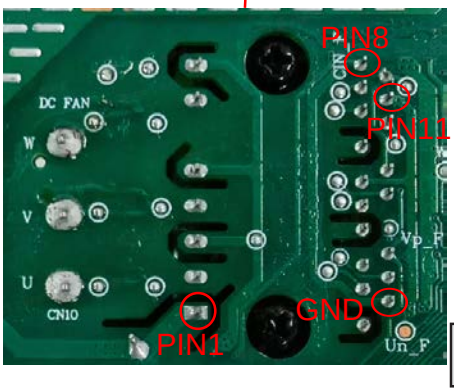
F8/LED1: 9 Flash

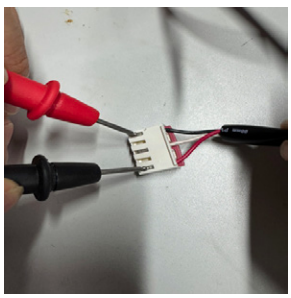
Outdoor DC Fan Motor Fault

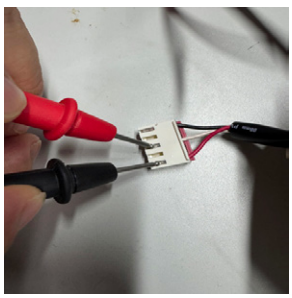
Detection Conditions:

Resistance values between any two wire harness connections is 101 +8%Ω









Error Codes (Indoor/Outdoor)

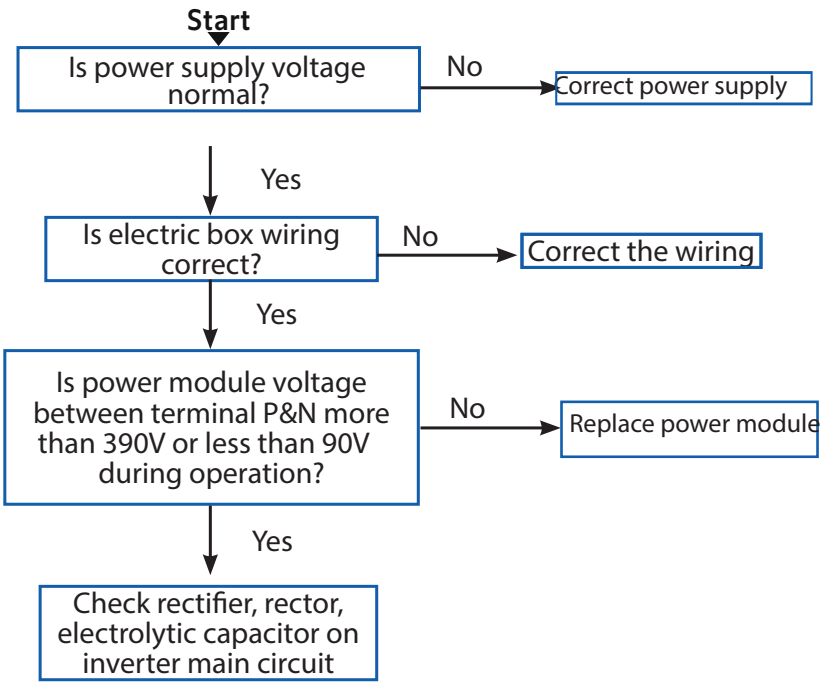
F19/LED1: 6 Flash

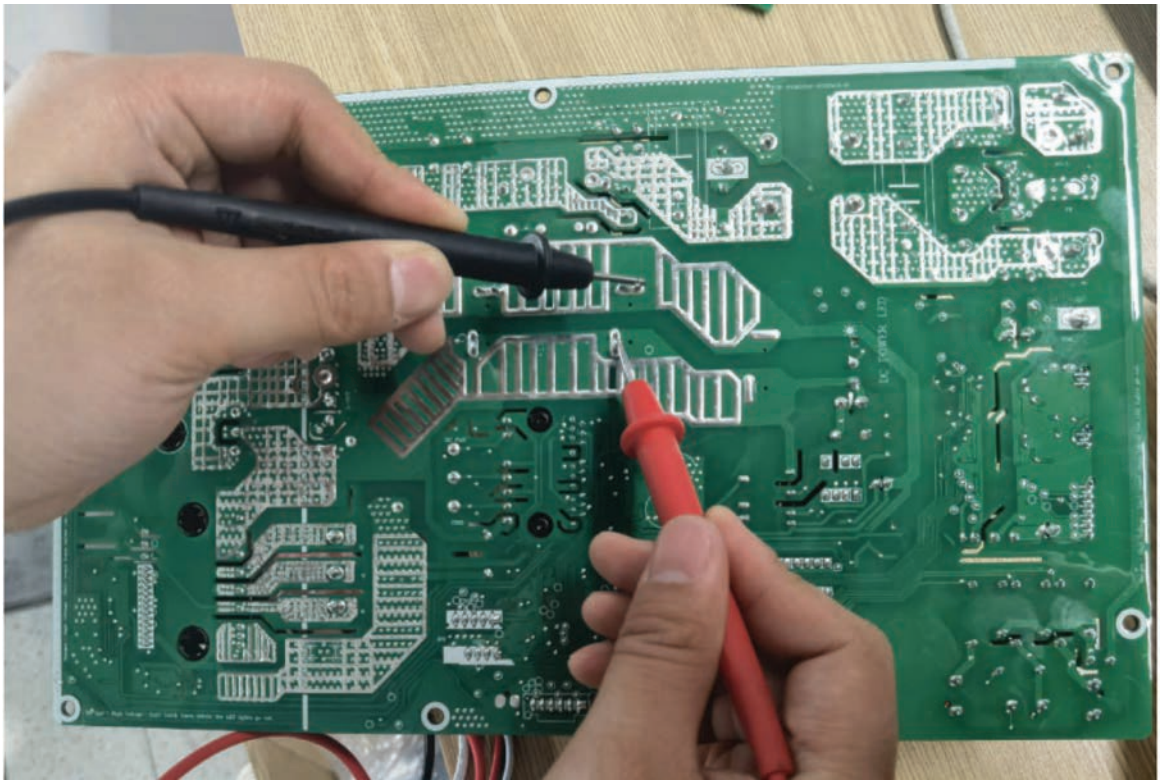
Power supply is over voltage or under voltage

Detection Conditions:

- *Abnormal voltage detection*
- *Terminal P&N more than 390V or less than 90V during operation*

- **Possible Causes:**
  Supply voltage not as specified
- *Faulty IPM module*
- *Faulty outdoor PCB*





Error Codes (Indoor/Outdoor)

F22/LED1: 3 Flash

AC current overload

F23/LED1: 35 Flash

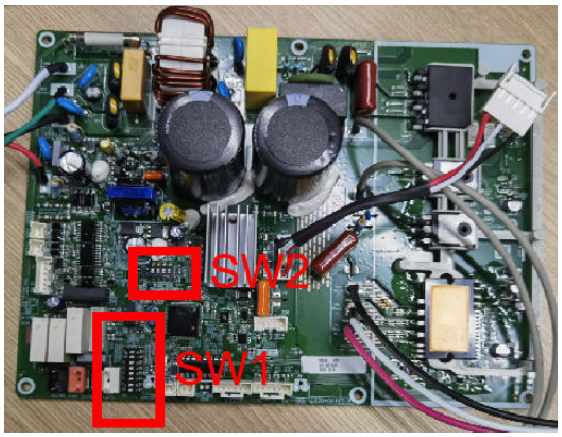
Phase current protection

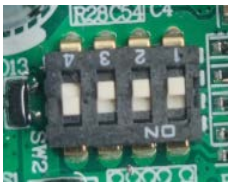
Detection Conditions:

Current value is over 14.4A

Possible Causes:

- *Incorrect compressor wiring*
- *The power module is bad*
- *The compressor is bad*





Error Codes (Indoor/Outdoor)

F4/LED1: 8 Flash

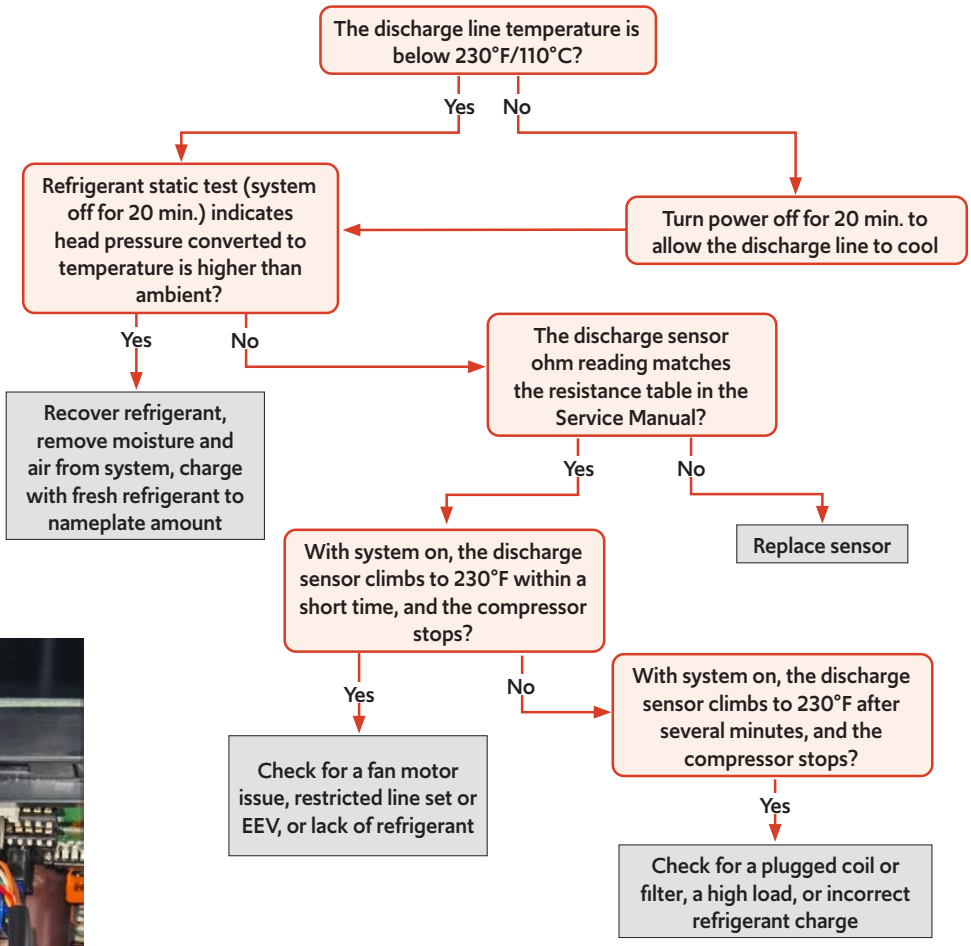
Overheat Protection for Discharge Temperature

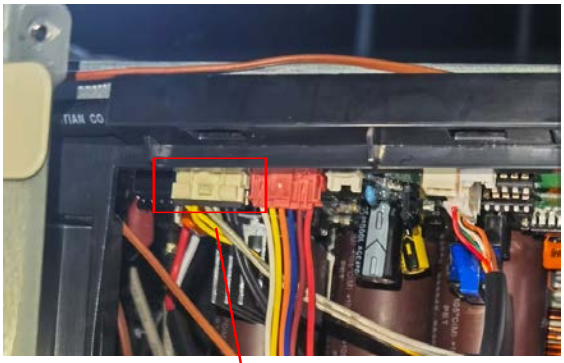
Detection Conditions:

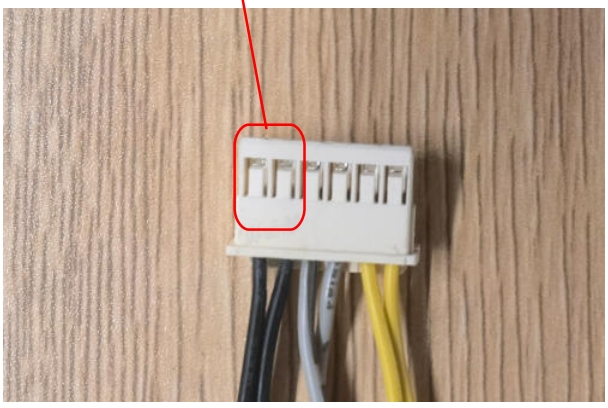
Compressor discharge temperature above 110°C

Possible Causes:

- *Faulty electronic expansion valve*
- *Faulty thermistor*
- *Faulty PCB*







Mesure this two wire to check resistance

Error Codes (Indoor/Outdoor)

E7/LED1: 15 Flash

ID and OD Loss of Communication

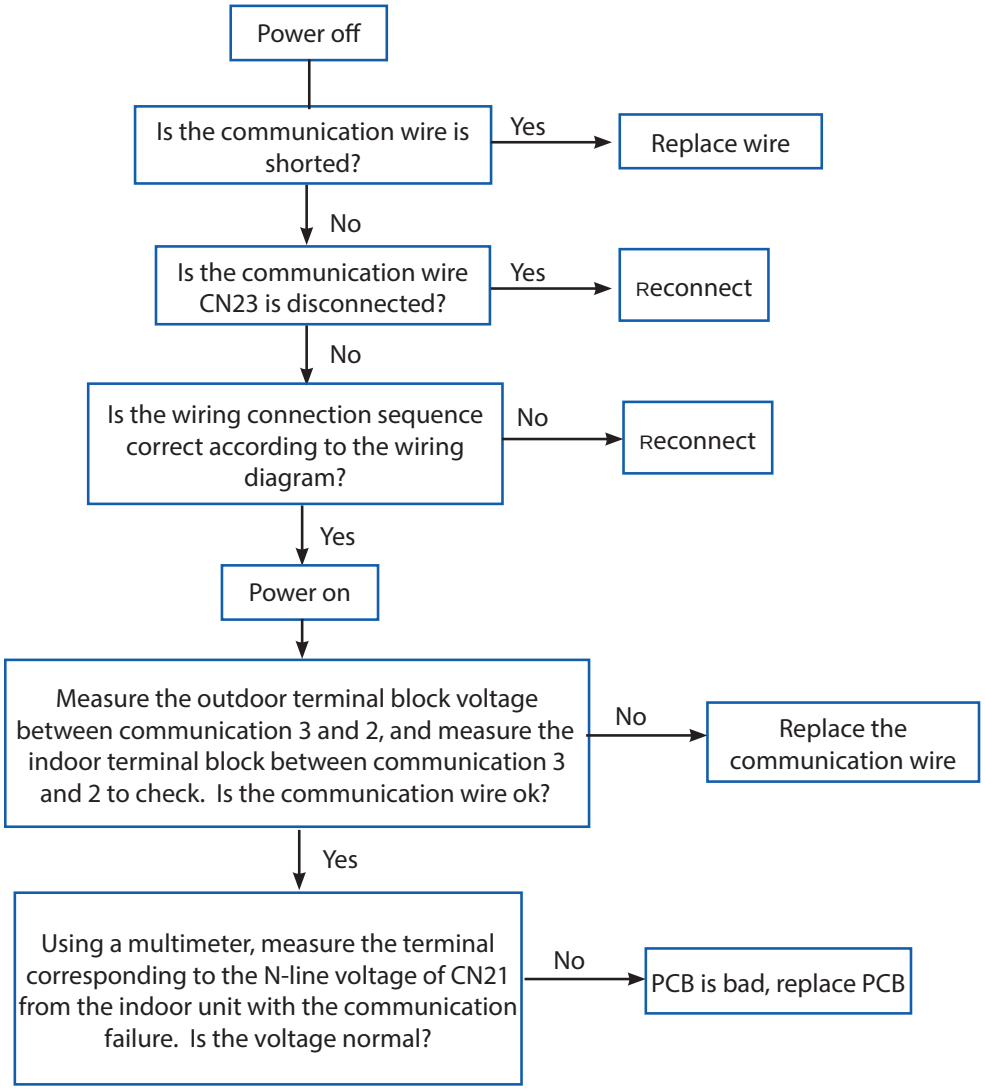
Detection Conditions:

Outdoor PCB communication failure

• Indoor PCB communication failure

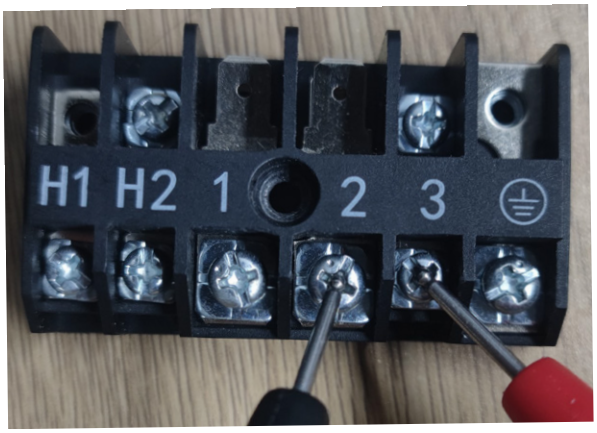
Possible Causes:

- *Communication wiring disconnected*
- *Faulty indoor PCB*
- *Faulty outdoor PCB*
- *Faulty Outdoor Fan (may cause communication signal interference)*



outdoor terminal

indoor terminal



Error Codes (Indoor/Outdoor)

F11/LED1: 18 or 19 Flash

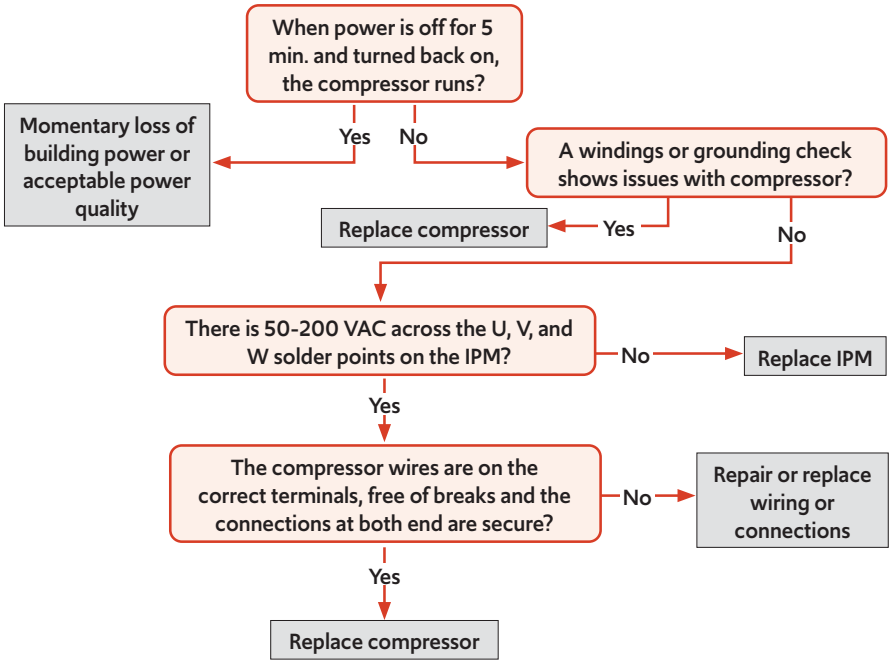
Loss of Compressor Synchronization

Detection Conditions:

Compressor faulty, miswired or wiring connection faulty

Possible Causes:

- *Faulty wiring*
- *Faulty compressor*
- *Faulty PCB*



Error Codes (Outdoor)

LED1: 21 Flash

Indoor Unit Over Temperature (Heating Mode Only)

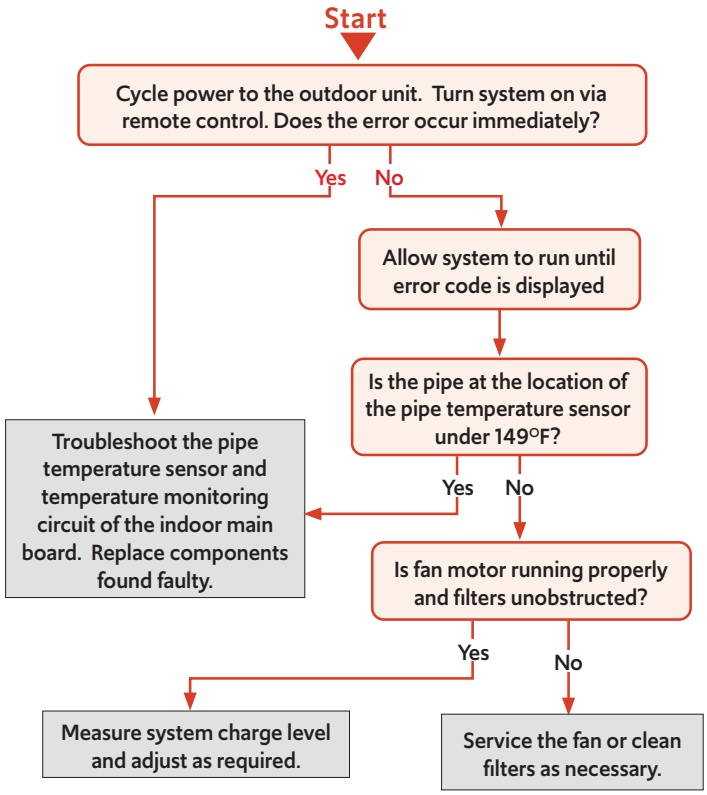
Detection Conditions:

Activated when the temperature being sensed by the heat exchanger pipe sensor rises above 149°F twice in 30 minutes.

Possible Causes:

- *Faulty electronic expansion valve*
- *Dirty heat exchanger*
- *Faulty heat-exchange sensor*
- *Refrigerant undercharge*

Note: this is a resetting fault that will not lockout operation.



Error Codes (Indoor/Outdoor)

LED1: 28 Flash

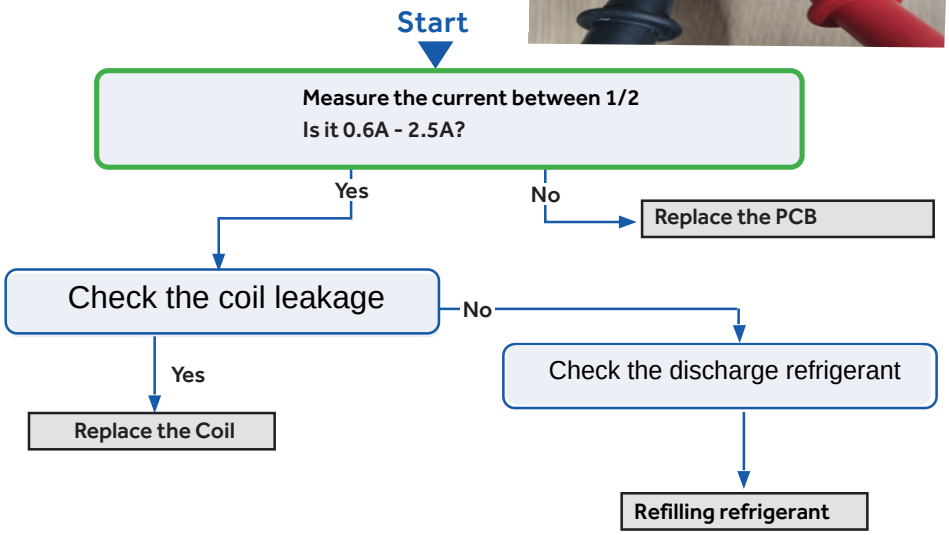
Lack of Refrigerant or Discharging

Detection Conditions:

Compressor operation frequency more than 46Hz,the current between 0.6A and 2.5A

Possible Causes:

- *Coil leakage*
- *Discharge refrigerant*



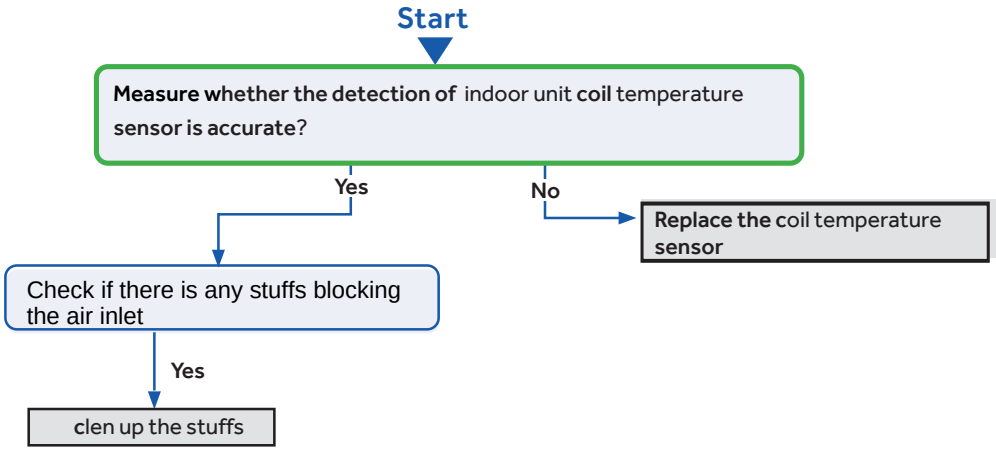
Error Codes (Indoor/Outdoor)

E22/LED1: 21 Flash

IDU Anti-Frosting Protection

Possible Causes:

- *Coil temperature sensor*
- *IDU air inlet blockage*



Error Codes (Indoor/Outdoor)

F27/LED1: 21 Flash

Compressor Current Sampling Circuit Fault

Detection Conditions:

It is compressor block fault, the compressor will not work when this fault happen. It also can be self recovery when this fault happens.

Possible Causes:

- *Ambient temperature is too low*
- *Compressor damage*

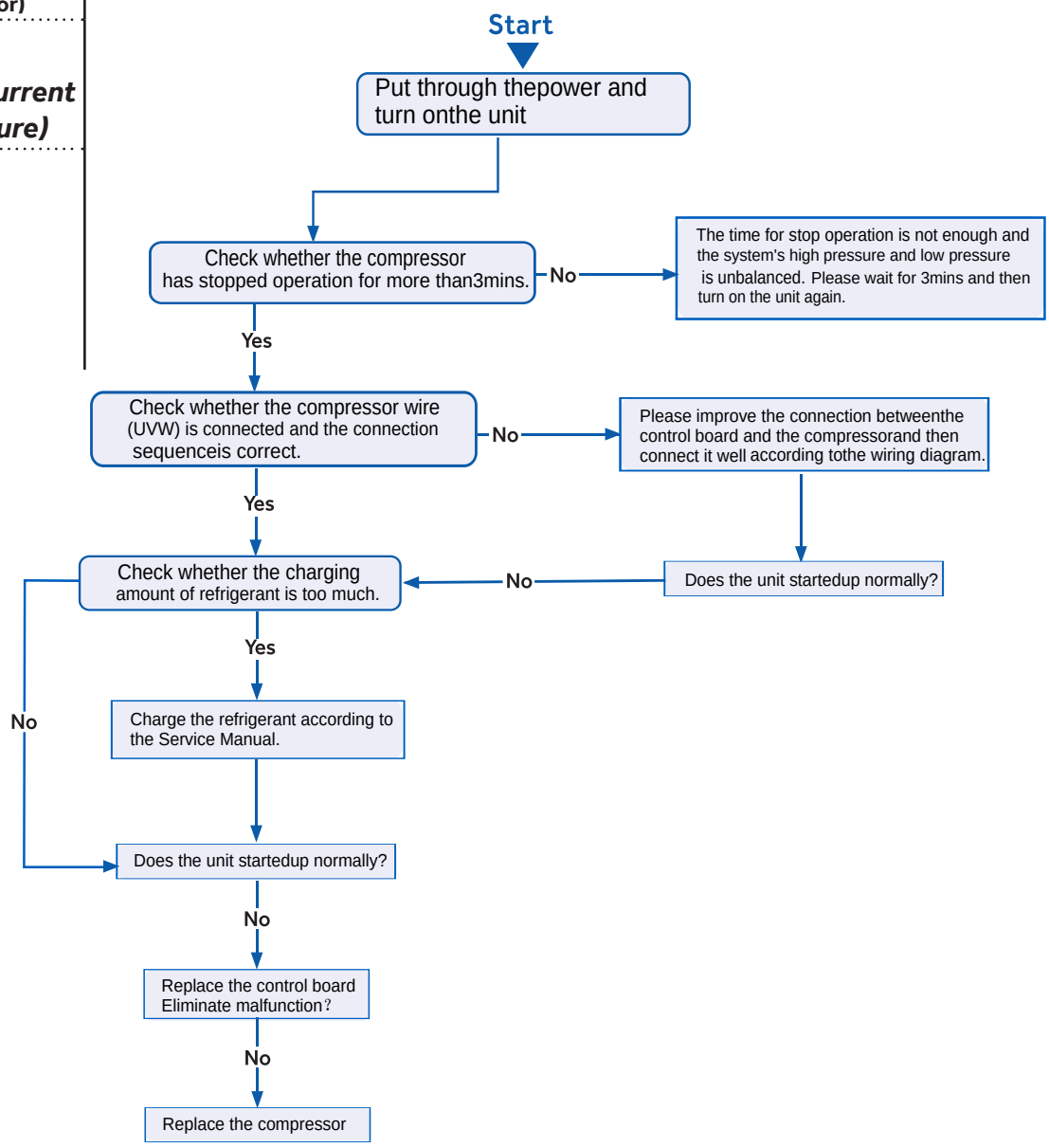
Error Codes (Indoor/Outdoor)

F2/LED1: 24 Flash

Module Operated Over Current (Compressor Startup Failure)

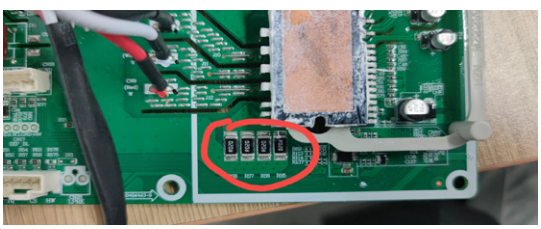
Possible Causes:

- *The power supply is abnormal*
- *Incorrect compressor wiring*
- *The power module is bad*
- *The compressor is bad*
- *System overload*



Trigger condition:

· The abnormal resistance value of R020 was collected, resulting in the F2 error code occurs



Error Codes (Indoor)

bA

DIP Switch Enabled, No Sensor Detected

Detection Conditions:

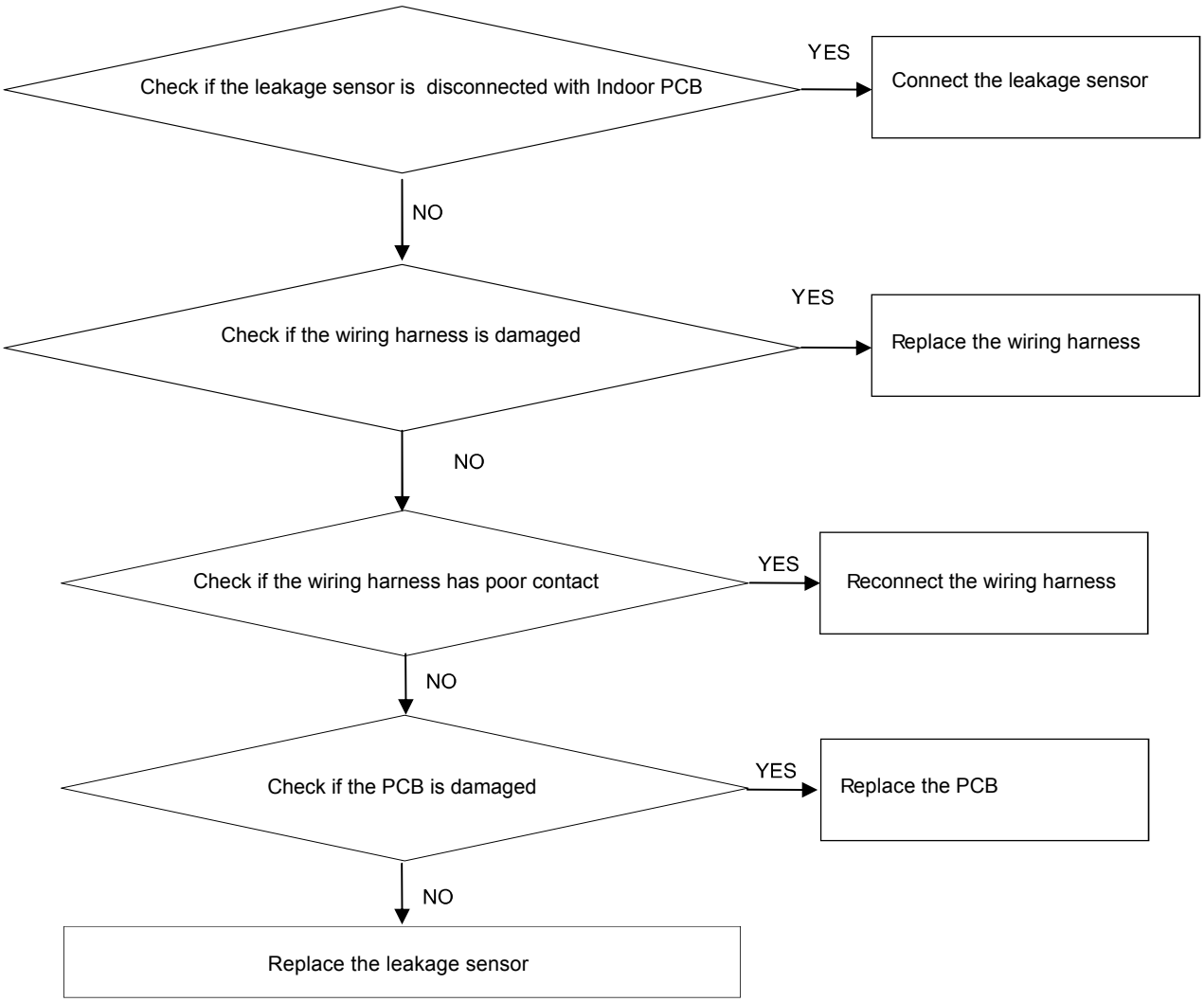
DIP Switch Enabled, No Sensor Detected

Possible Causes:

- *Loose wiring terminals*
- *Damaged wiring harness*
- *The leakage sensor is not connected*
- *PCB damage*

*** Caution**

Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



Error Codes (Indoor)

AA and Ab

Refrigerant Leakage Fault

Detection Conditions:

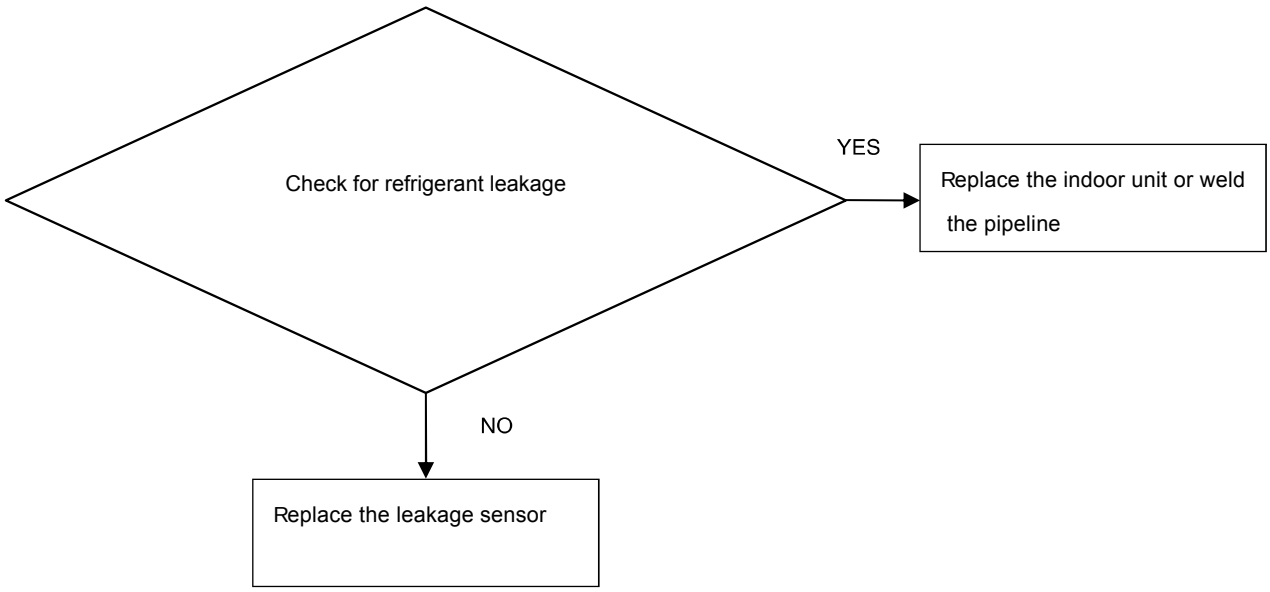
- *AA: Refrigerant concentration over 10% LFL*
- *Ab: AA display after 5 minutes and refrigerant concentration of less than 8% LFL detected*

Possible Causes:

- *Pipe cracking*
- *The union nut is not secured*

*** Caution**

Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



Error Codes (Indoor)

Ac

Leakage Sensor Communication Fault

Detection Conditions:

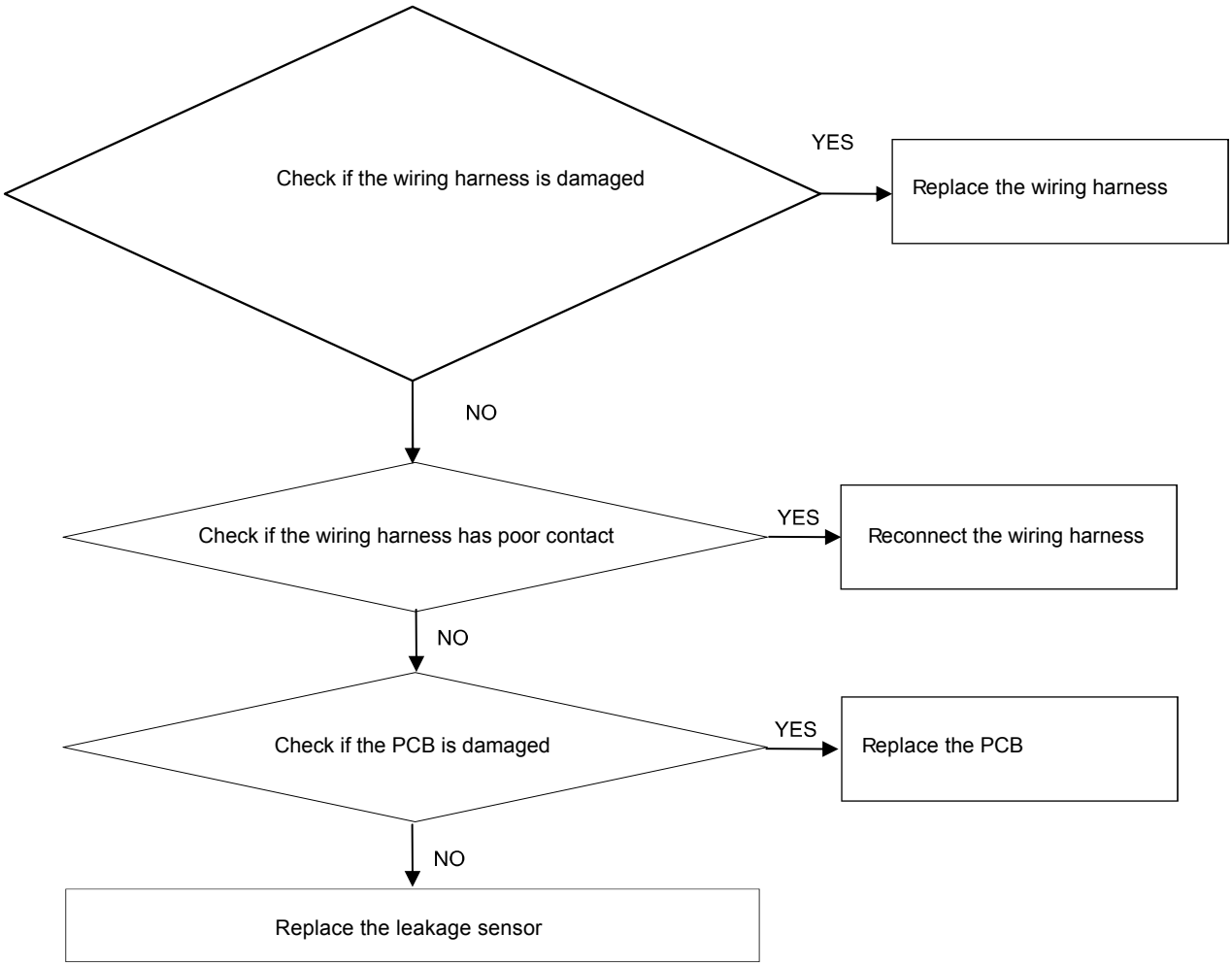
The communication between the leakage sensor and the PCB is faulty

Possible Causes:

- *Loose wiring terminals*
- *Damaged wiring harness*
- *PCB damage*

*** Caution**

Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



Error Codes (Indoor)

Ad

Leakage Sensor Self-Check Fault

Detection Conditions:

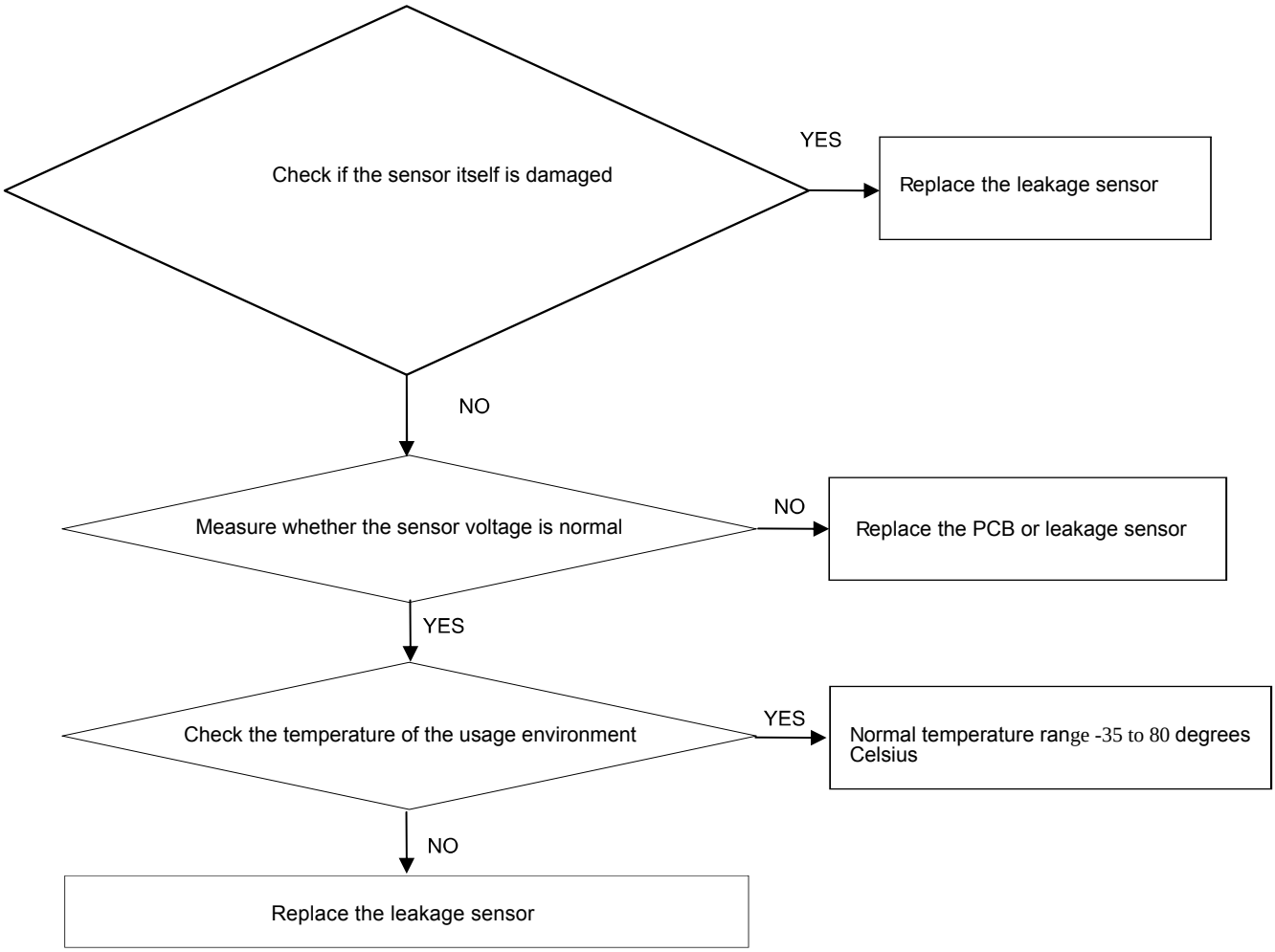
Leakage sensor self-test failed

Possible Causes:

- *Power supply overvoltage and undervoltage (5VDC)*
- *The temperature value detected by the leakage sensor exceeds the limit value*
- *Internal sensor error*

*** Caution**

Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



Error Codes (Indoor)

AE

Leakage Sensor Reaching-End-of-Life Warning

Detection Conditions:

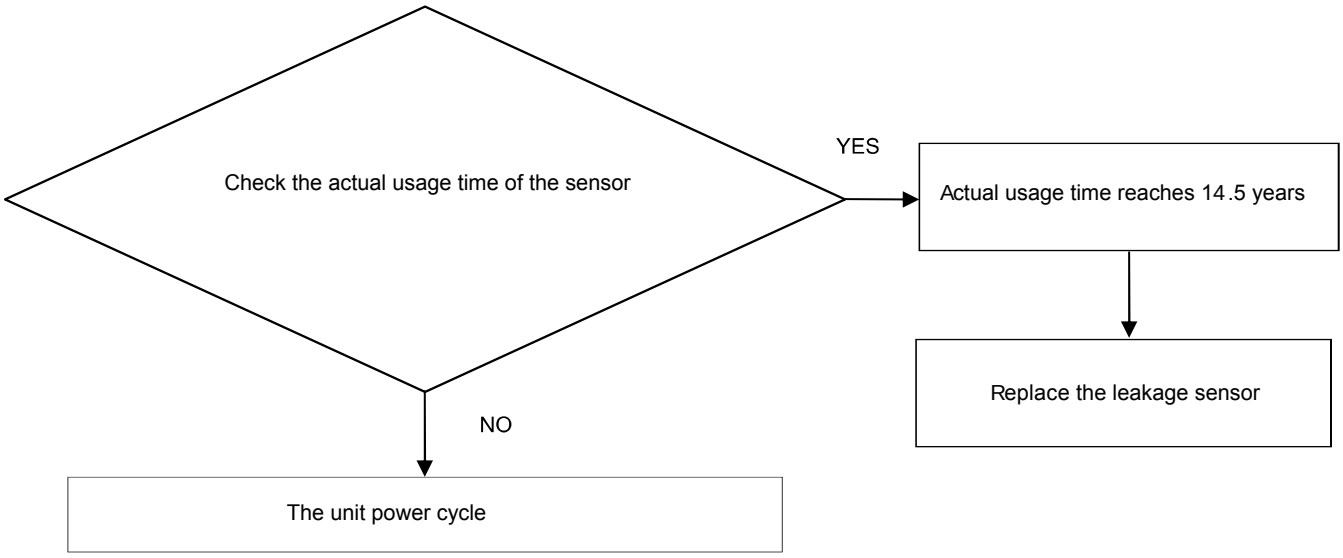
The sensor is 6 months away from the end of its life

Possible Causes:

- *The sensor approaching the end of life*
- *End of life counting error of sensor*

*** Caution**

Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



Error Codes (Indoor)

AF

Leakage Sensor End- Of- Life

Detection Conditions:

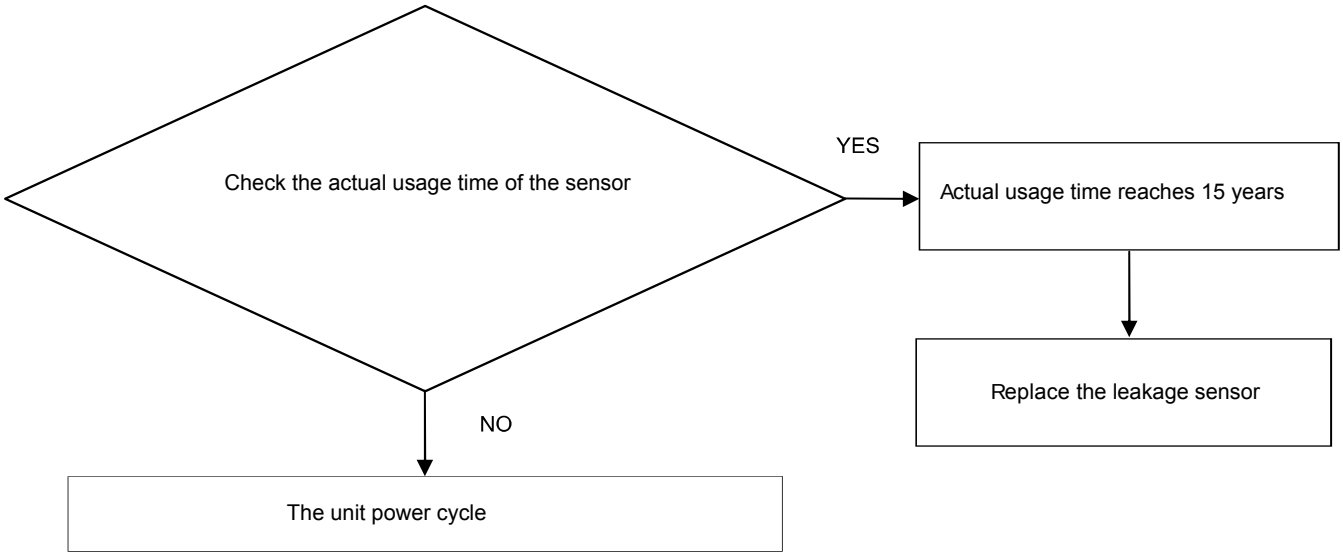
The sensors have reached the end of life

Possible Causes:

- *The sensor approaching the end of life*
- *End of life counting error of sensor*

*** Caution**

Be sure to turn off power switch before connect or disconnect connector, or else parts damage may be occurred.



SENSOR RESISTANCE TABLES

B25/50=3700K±3% R25=10KΩ±3%							
Temp	Resistance(KΩ)			Temp	Resistance(KΩ)		
(°C)	Rmax	R (t) Normal	Rmin	(°C)	Rmax	R (t) Normal	Rmin
-40	246.890	229.239	211.587	11	18.864	18.135	17.406
-39	233.754	217.183	200.612	12	18.039	17.354	16.669
-38	221.368	205.809	190.250	13	17.254	16.611	15.968
-37	209.686	195.075	180.464	14	16.507	15.903	15.299
-36	198.665	184.942	171.219	15	15.797	15.229	14.661
-35	188.265	175.375	162.485	16	15.120	14.587	14.054
-34	178.449	166.339	154.230	17	14.476	13.975	13.474
-33	169.181	157.803	146.426	18	13.862	13.392	12.922
-32	160.429	149.738	139.046	19	13.277	12.836	12.395
-31	152.162	142.114	132.067	20	12.720	12.306	11.892
-30	144.350	134.907	125.464	21	12.189	11.801	11.413
-29	136.519	127.675	118.831	22	11.683	11.319	10.955
-28	129.381	121.081	112.781	23	11.200	10.858	10.516
-27	122.638	114.849	107.060	24	10.739	10.419	10.099
-26	116.268	108.958	101.648	25	10.300	10.000	9.700
-25	110.249	103.388	96.527	26	9.894	9.600	9.306
-24	104.563	98.123	91.683	27	9.505	9.217	8.929
-23	99.190	93.144	87.098	28	9.134	8.852	8.570
-22	94.111	88.435	82.759	29	8.779	8.503	8.227
-21	89.311	83.982	78.653	30	8.441	8.170	7.899
-20	84.518	79.529	74.540	31	8.116	7.851	7.586
-19	80.484	75.785	71.086	32	7.805	7.546	7.287
-18	76.428	72.015	67.602	33	7.509	7.255	7.001
-17	72.591	68.447	64.303	34	7.225	6.976	6.727
-16	68.963	65.071	61.179	35	6.953	6.710	6.467
-15	65.530	61.874	58.218	36	6.692	6.454	6.216
-14	62.283	58.848	55.413	37	6.443	6.210	5.977
-13	59.210	55.983	52.756	38	6.204	5.976	5.748
-12	56.300	53.269	50.238	39	5.976	5.753	5.530
-11	53.547	50.699	47.851	40	5.756	5.538	5.320
-10	50.940	48.264	45.588	41	5.546	5.333	5.120
-9	48.472	45.957	43.442	42	5.345	5.136	4.927
-8	46.134	43.770	41.406	43	5.151	4.947	4.743
-7	43.918	41.697	39.476	44	4.967	4.767	4.567
-6	41.819	39.731	37.643	45	4.788	4.593	4.398
-5	39.830	37.868	35.906	46	4.618	4.427	4.236
-4	37.944	36.100	34.256	47	4.455	4.268	4.081
-3	36.157	34.423	32.689	48	4.298	4.115	3.932
-2	34.462	32.832	31.202	49	4.147	3.968	3.789
-1	32.854	31.322	29.790	50	4.004	3.829	3.654

B25/50=3700K±3% R25=10KΩ±3%							
Temp	Resistance(KΩ)			Temp	Resistance(KΩ)		
(°C)	Rmax	R (t) Normal	Rmin	(°C)	Rmax	R (t) Normal	Rmin
0	31.362	29.920	28.478	51	3.863	3.692	3.521
1	29.881	28.527	27.173	52	3.729	3.562	3.395
2	28.507	27.234	25.961	53	3.601	3.438	3.275
3	27.202	26.006	24.810	54	3.478	3.318	3.158
4	25.965	24.840	23.715	55	3.359	3.203	3.047
5	24.788	23.731	22.674	56	3.246	3.093	2.940
6	23.672	22.678	21.684	57	3.136	2.987	2.838
7	22.610	21.676	20.742	58	3.031	2.885	2.739
8	21.601	20.723	19.845	59	2.930	2.787	2.644
9	20.642	19.817	18.992	60	2.833	2.693	2.553
10	19.730	18.955	18.180	61	2.739	2.602	2.465
62	2.649	2.515	2.381	84	1.321	1.238	1.155
63	2.562	2.431	2.300	85	1.281	1.200	1.119
64	2.478	2.350	2.222	86	1.244	1.165	1.086
65	2.398	2.273	2.148	87	1.209	1.131	1.053
66	2.320	2.198	2.076	88	1.173	1.097	1.021
67	2.246	2.126	2.006	89	1.140	1.065	0.990
68	2.174	2.057	1.940	90	1.107	1.034	0.961
69	2.104	1.990	1.876	91	1.076	1.004	0.932
70	2.038	1.926	1.814	92	1.045	0.975	0.905
71	1.974	1.864	1.754	93	1.016	0.947	0.878
72	1.912	1.805	1.698	94	0.987	0.920	0.853
73	1.853	1.748	1.643	95	0.960	0.894	0.828
74	1.795	1.692	1.589	96	0.934	0.869	0.804
75	1.739	1.639	1.539	97	0.907	0.844	0.781
76	1.686	1.588	1.490	98	0.883	0.821	0.759
77	1.634	1.538	1.442	99	0.859	0.798	0.737
78	1.585	1.491	1.397	100	0.836	0.776	0.716
79	1.537	1.445	1.353	101	0.814	0.755	0.696
80	1.490	1.400	1.310	102	0.791	0.734	0.677
81	1.445	1.357	1.269	103	0.771	0.715	0.659
82	1.402	1.316	1.230	104	0.750	0.695	0.640
83	1.361	1.276	1.191	105	0.731	0.677	0.623

SENSOR RESISTANCE TABLES

B25/50=4200K±1%, R25°C=23KΩ±2%							
Temp	Resistance(KΩ)			Temp	Resistance(KΩ)		
(°C)	Rmax	R (t) Normal	Rmin	(°C)	Rmax	R (t) Normal	Rmin
-30.0	511.383	487.031	462.680	18.0	32.935	32.169	31.403
-29.0	478.574	456.022	433.470	19.0	31.351	30.638	29.925
-28.0	448.361	427.455	406.549	20.0	29.850	29.187	28.524
-27.0	420.230	400.844	381.458	21.0	28.430	27.813	27.196
-26.0	394.026	376.044	358.062	22.0	27.086	26.512	25.938
-25.0	369.606	352.922	336.238	23.0	25.811	25.278	24.745
-24.0	346.838	331.355	315.872	24.0	24.604	24.109	23.614
-23.0	325.602	311.229	296.856	25.0	23.460	23.000	22.540
-22.0	305.786	292.440	279.094	26.0	22.397	21.948	21.499
-21.0	287.287	274.892	262.497	27.0	21.387	20.950	20.513
-20.0	269.723	258.221	246.718	28.0	20.429	20.003	19.577
-19.0	253.871	243.171	232.471	29.0	19.521	19.105	18.689
-18.0	238.784	228.840	218.896	30.0	18.656	18.251	17.846
-17.0	224.677	215.433	206.189	31.0	17.835	17.440	17.045
-16.0	211.482	202.887	194.292	32.0	17.054	16.670	16.286
-15.0	199.133	191.140	183.147	33.0	16.313	15.938	15.563
-14.0	187.574	180.139	172.704	34.0	15.608	15.243	14.878
-13.0	176.749	169.832	162.915	35.0	14.936	14.581	14.226
-12.0	166.607	160.171	153.735	36.0	14.299	13.953	13.607
-11.0	157.103	151.113	145.123	37.0	13.691	13.354	13.017
-10.0	148.191	142.616	137.041	38.0	13.113	12.785	12.457
-9.0	139.834	134.644	129.454	39.0	12.563	12.243	11.923
-8.0	131.993	127.161	122.329	40.0	12.038	11.727	11.416
-7.0	124.634	120.134	115.634	41.0	11.539	11.236	10.933
-6.0	117.724	113.534	109.344	42.0	11.063	10.768	10.473
-5.0	111.235	107.332	103.429	43.0	10.611	10.323	10.035
-4.0	105.139	101.503	97.867	44.0	10.178	9.898	9.618
-3.0	99.408	96.021	92.634	45.0	9.766	9.493	9.220
-2.0	94.022	90.866	87.710	46.0	9.373	9.107	8.841
-1.0	88.955	86.015	83.075	47.0	8.998	8.739	8.480
0.0	84.220	81.479	78.739	48.0	8.640	8.388	8.136
1.0	79.704	77.151	74.598	49.0	8.299	8.053	7.807
2.0	75.481	73.102	70.723	50.0	7.974	7.734	7.495
3.0	71.505	69.288	67.071	51.0	7.661	7.428	7.195
4.0	67.759	65.693	63.627	52.0	7.363	7.136	6.909
5.0	64.230	62.304	60.378	53.0	7.079	6.858	6.637
6.0	60.903	59.108	57.313	54.0	6.807	6.592	6.377
7.0	57.767	56.094	54.421	55.0	6.547	6.337	6.127
8.0	54.808	53.249	51.690	56.0	6.300	6.095	5.890
9.0	52.017	50.564	49.111	57.0	6.061	5.862	5.663
10.0	49.383	48.029	46.675	58.0	5.834	5.640	5.446
11.0	46.896	45.635	44.374	59.0	5.617	5.428	5.239
12.0	44.548	43.373	42.198	60.0	5.410	5.225	5.040
13.0	42.331	41.236	40.141	61.0	5.210	5.030	4.850
14.0	40.235	39.215	38.195	62.0	5.019	4.844	4.669
15.0	38.254	37.304	36.354	63.0	4.837	4.666	4.495
16.0	36.381	35.497	34.613	64.0	4.662	4.495	4.328
17.0	34.611	33.788	32.965	65.0	4.494	4.332	4.170

B25/50=4200K±1%, R25°C=23KΩ±2%							
Temp	Resistance(KΩ)			Temp	Resistance(KΩ)		
(°C)	Rmax	R (t) Normal	Rmin	(°C)	Rmax	R (t) Normal	Rmin
66.0	4.333	4.175	4.017	86.0	2.182	2.085	1.988
67.0	4.179	4.025	3.871	87.0	2.112	2.017	1.922
68.0	4.032	3.881	3.730	88.0	2.046	1.953	1.860
69.0	3.890	3.743	3.596	89.0	1.981	1.890	1.799
70.0	3.754	3.611	3.468	90.0	1.919	1.830	1.741
71.0	3.624	3.484	3.344	91.0	1.859	1.772	1.685
72.0	3.498	3.362	3.226	92.0	1.801	1.716	1.631
73.0	3.378	3.245	3.112	93.0	1.745	1.662	1.579
74.0	3.263	3.133	3.003	94.0	1.691	1.610	1.529
75.0	3.153	3.026	2.899	95.0	1.639	1.560	1.481
76.0	3.046	2.922	2.798	96.0	1.589	1.512	1.435
77.0	2.944	2.823	2.702	97.0	1.540	1.465	1.390
78.0	2.845	2.727	2.609	98.0	1.494	1.420	1.346
79.0	2.751	2.636	2.521	99.0	1.449	1.377	1.305
80.0	2.659	2.547	2.435	100.0	1.406	1.335	1.264
81.0	2.573	2.463	2.353	101.0	1.363	1.294	1.225
82.0	2.488	2.381	2.274	102.0	1.322	1.255	1.188
83.0	2.407	2.303	2.199	103.0	1.283	1.217	1.151
84.0	2.329	2.227	2.125	104.0	1.244	1.180	1.116
85.0	2.253	2.154	2.054	105.0	1.208	1.145	1.082

SENSOR RESISTANCE TABLES

B25/80=4450K±3% R80=50KΩ±3%							
Temp	Resistance(KΩ)			Temp	Resistance(KΩ)		
(°C)	Rmax	R (t) Normal	Rmin	(°C)	Rmax	R (t) Normal	Rmin
-40	23982.342	21280.977	18579.613	11	1126.419	1041.293	956.167
-39	22397.462	19890.917	17384.372	12	1067.463	987.477	907.491
-38	20925.744	18599.155	16272.567	13	1011.977	936.799	861.621
-37	19558.506	17398.211	15237.916	14	959.732	889.052	818.372
-36	18287.777	16281.212	14274.647	15	910.510	844.042	777.574
-35	17106.237	15241.843	13377.450	16	864.114	801.590	739.066
-34	16007.159	14274.298	12541.437	17	820.361	761.533	702.705
-33	14984.359	13373.234	11762.109	18	779.081	723.717	668.353
-32	14032.148	12533.735	11035.322	19	740.117	688.001	635.885
-31	13145.291	11751.273	10357.255	20	703.323	654.254	605.185
-30	12318.968	11021.678	9724.388	21	668.565	622.355	576.145
-29	11551.311	10343.407	9135.504	22	635.715	592.189	548.663
-28	10835.229	9710.234	8585.239	23	604.657	563.651	522.645
-27	10167.003	9118.935	8070.867	24	575.282	536.644	498.006
-26	9543.200	8566.532	7589.865	25	547.490	511.076	474.662
-25	8960.652	8050.276	7139.901	26	521.186	486.862	452.538
-24	8416.430	7567.624	6718.818	27	496.281	463.922	431.563
-23	7907.828	7116.224	6324.620	28	472.693	442.182	411.671
-22	7432.345	6693.901	5955.457	29	450.344	421.572	392.800
-21	6987.666	6298.642	5609.618	30	429.165	402.028	374.891
-20	6571.650	5928.583	5285.516	31	409.087	383.489	357.891
-19	6187.164	5586.374	4985.585	32	390.047	365.898	341.749
-18	5826.712	5265.313	4703.915	33	371.986	349.201	326.416
-17	5488.692	4964.004	4439.315	34	354.850	333.349	311.848
-16	5171.616	4681.148	4190.680	35	338.586	318.295	298.004
-15	4874.100	4415.539	3956.978	36	323.147	303.995	284.843
-14	4594.858	4166.054	3737.249	37	308.485	290.407	272.329
-13	4332.694	3931.647	3530.600	38	294.559	277.493	260.427
-12	4086.494	3711.346	3336.198	39	281.328	265.216	249.104
-11	3855.222	3504.244	3153.266	40	268.753	253.541	238.329
-10	3637.915	3309.498	2981.082	41	256.801	242.437	228.073
-9	3433.673	3126.321	2818.969	42	245.438	231.873	218.308
-8	3241.661	2953.980	2666.299	43	234.630	221.820	209.010
-7	3061.098	2791.790	2522.482	44	224.350	212.252	200.154
-6	2891.257	2639.114	2386.971	45	214.569	203.142	191.715
-5	2731.460	2495.357	2259.253	46	205.260	194.467	183.674
-4	2581.076	2359.962	2138.848	47	196.399	186.204	176.009
-3	2439.514	2232.412	2025.310	48	187.963	178.333	168.703
-2	2306.222	2112.221	1918.220	49	179.929	170.832	161.735
-1	2180.688	1998.938	1817.187	50	172.275	163.682	155.089
0	2094.972	1921.993	1749.014	51	164.984	156.866	148.748
1	1975.099	1813.265	1651.431	52	158.036	150.367	142.698
2	1863.127	1711.646	1560.165	53	151.412	144.168	136.924
3	1758.449	1616.593	1474.737	54	145.099	138.255	131.411
4	1660.513	1527.611	1394.709	55	139.078	132.613	126.148
5	1568.817	1444.250	1319.683	56	133.336	127.229	121.122
6	1482.897	1366.096	1249.295	57	127.858	122.089	116.320
7	1402.336	1292.773	1183.210	58	122.630	117.181	111.732

B25/80=4450K±3% R80=50KΩ±3%							
Temp	Resistance(KΩ)			Temp	Resistance(KΩ)		
(°C)	Rmax	R (t) Normal	Rmin	(°C)	Rmax	R (t) Normal	Rmin
8	1326.746	1223.935	1121.124	59	117.641	112.494	107.347
9	1255.774	1159.265	1062.756	60	112.879	108.018	103.157
10	1189.098	1098.474	1007.850	61	108.332	103.741	99.150
62	103.989	99.654	95.319	107	20.667	19.720	18.773
63	99.841	95.748	91.655	108	20.020	19.091	18.162
64	95.879	92.014	88.149	109	19.397	18.485	17.573
65	92.091	88.443	84.795	110	18.795	17.900	17.005
66	88.472	85.028	81.584	111	18.215	17.337	16.459
67	85.011	81.761	78.511	112	17.655	16.793	15.931
68	81.703	78.636	75.569	113	17.114	16.268	15.422
69	78.538	75.645	72.752	114	16.593	15.763	14.933
70	75.510	72.781	70.052	115	16.090	15.275	14.460
71	72.614	70.040	67.466	116	15.603	14.804	14.005
72	69.842	67.415	64.988	117	15.133	14.349	13.565
73	67.189	64.901	62.613	118	14.681	13.911	13.141
74	64.649	62.493	60.337	119	14.243	13.488	12.733
75	62.216	60.185	58.154	120	13.821	13.080	12.339
76	59.886	57.973	56.060	121	13.412	12.685	11.958
77	57.653	55.852	54.051	122	13.019	12.305	11.591
78	55.515	53.820	52.125	123	12.638	11.938	11.238
79	53.465	51.870	50.275	124	12.271	11.584	10.897
80	51.500	50.000	48.500	125	11.917	11.242	10.567
81	49.684	48.206	46.728	126	11.573	10.911	10.249
82	47.940	46.484	45.028	127	11.243	10.593	9.943
83	46.267	44.832	43.397	128	10.923	10.285	9.647
84	44.659	43.246	41.833	129	10.614	9.988	9.362
85	43.114	41.723	40.332	130	10.315	9.701	9.087
86	41.629	40.260	38.891	131	10.028	9.425	8.822
87	40.203	38.856	37.509	132	9.750	9.158	8.566
88	38.831	37.506	36.181	133	9.481	8.900	8.319
89	37.513	36.209	34.905	134	9.222	8.651	8.080
90	36.244	34.962	33.680	135	8.972	8.411	7.850
91	35.025	33.764	32.503	136	8.731	8.180	7.629
92	33.851	32.612	31.373	137	8.498	7.957	7.416
93	32.722	31.504	30.286	138	8.273	7.741	7.209
94	31.636	30.439	29.242	139	8.055	7.533	7.011
95	30.590	29.413	28.236	140	7.846	7.333	6.820
96	29.583	28.427	27.271	141	7.628	7.125	6.621
97	28.614	27.478	26.342	142	7.417	6.923	6.429
98	27.680	26.564	25.448	143	7.213	6.728	6.243
99	26.781	25.685	24.589	144	7.014	6.538	6.062
100	25.914	24.838	23.762	145	6.822	6.355	5.888
101	25.080	24.023	22.966	146	6.636	6.178	5.719
102	24.275	23.237	22.199	147	6.455	6.006	5.556
103	23.500	22.481	21.462	148	6.280	5.839	5.398
104	22.753	21.752	20.751	149	6.111	5.678	5.244
105	22.031	21.049	20.067	150	5.946	5.521	5.096
106	21.336	20.372	19.408				

SENSOR RESISTANCE VALUES

Abbr.	Definition	Type
tAo	Temperature of outdoor ambient	10K
tc	Temperature of outdoor condenser	10K
td	Temperature of outdoor discharge	50K
tE	Temperature of outdoor defrost	10K
tS	Temperature of outdoor suction	10K
tdr	Temperature of compressor driver module	10K
Idr	Current of the compressor	10K

Abbr.	Definition	Type
tAI	Temperature of indoor ambient	10K
TCI	Temperature of indoor condenser	10K
Toci	Hot Gas Leaving the 4-Way Valve	10K
Tc2	EEV Liquid Sensor	10K
Tc1	EEV Gas Sensor	10K
Tm	Module Temp Sensor	10K
TAI	Temperature of indoor ambient (9K/12K Tempo & All CAC)	23K

10K Sensors: Ambient (all except ducted, cassette, and 9K-12K Tempo) suction, gas, defrost, and pipe sensors.
23K Sensors: Ambient sensors for ducted, cassette, and 9K-12K Tempo
50K Sensors: Discharge sensors

°F	°C	Normal (KΩ) 10K SENSORS	23K SENSORS	50K SENSORS
-22	-30	147.95	513.115	12061.74
-20.2	-29	139.56	478.894	11267.87
-18.4	-28	131.70	447.408	10531.37
-16.6	-27	124.34	418.379	9847.72
-14.8	-26	117.44	391.564	9212.81
-13	-25	110.96	366.751	8622.85
-11.2	-24	104.89	343.754	8074.38
-9.4	-23	99.19	322.407	7564.22
-7.6	-22	93.83	302.567	7089.47
-5.8	-21	88.80	284.105	6647.45
-4	-20	84.07	266.905	6235.71
-2.2	-19	79.62	250.866	5851.99
-0.4	-18	75.44	235.895	5494.21
1.4	-17	71.50	221.911	5160.46
3.2	-16	67.79	208.838	4849.00
5	-15	64.30	196.609	4558.19
6.8	-14	61.01	185.163	4286.55
8.6	-13	57.91	174.443	4032.71
10.4	-12	54.99	164.399	3795.39
12.2	-11	52.23	154.983	3573.43
14	-10	49.62	146.153	3365.73
15.8	-9	47.17	137.87	3171.31
17.6	-8	44.85	130.096	2989.25
19.4	-7	42.65	122.799	2818.67
21.2	-6	40.58	115.946	2658.81
23	-5	38.62	109.51	2508.91
24.8	-4	36.77	103.462	2368.32
26.6	-3	35.01	97.779	2236.39
28.4	-2	33.36	92.437	2112.55
30.2	-1	31.78	87.415	1996.25
32	0	30.30	82.691	1887.00
33.8	1	28.89	78.248	1784.33
35.6	2	27.55	74.067	1687.81
37.4	3	26.29	70.133	1597.04
39.2	4	25.09	66.43	1511.65
41	5	23.95	62.943	1431.28
42.8	6	22.87	59.659	1355.62
44.6	7	21.84	56.566	1284.36
46.4	8	20.87	53.651	1217.23
48.2	9	19.94	50.904	1153.96
50	10	19.06	48.314	1094.32
51.8	11	18.23	45.872	1038.07
53.6	12	17.43	43.569	985.01
55.4	13	16.68	41.395	934.94
57.2	14	15.96	39.343	887.68
59	15	15.28	37.406	843.05
60.8	16	14.63	35.577	800.89
62.6	17	14.01	33.848	761.06
64.4	18	13.42	32.215	723.41
66.2	19	12.86	30.671	687.82
68	20	12.32	29.21	654.16
69.8	21	11.81	27.828	622.32
71.6	22	11.33	26.521	592.18
73.4	23	10.86	25.283	563.66
75.2	24	10.42	24.111	536.65
77	25	10.00	23	511.08
78.8	26	9.60	21.947	486.94
80.6	27	9.21	20.949	464.05

°F	°C	Normal (KΩ) 10K SENSORS	23K SENSORS	50K SENSORS
82.4	28	8.85	20.003	442.35
84.2	29	8.50	19.104	421.77
86	30	8.16	18.252	402.24
87.8	31	7.84	17.442	383.72
89.6	32	7.54	16.674	366.13
91.4	33	7.25	15.943	349.43
93.2	34	6.97	15.249	333.58
95	35	6.70	14.588	318.52
96.8	36	6.45	13.96	304.22
98.6	37	6.20	13.362	290.62
100.4	38	5.97	12.794	277.70
102.2	39	5.75	12.252	265.41
104	40	5.53	11.736	253.73
105.8	41	5.33	11.244	242.62
107.6	42	5.13	10.776	232.04
109.4	43	4.94	10.329	221.98
111.2	44	4.76	9.904	212.41
113	45	4.59	9.497	203.29
114.8	46	4.43	9.11	194.61
116.6	47	4.27	8.74	186.34
118.4	48	4.11	8.387	178.46
120.2	49	3.97	8.05	170.95
122	50	3.83	7.728	163.80
123.8	51	3.69	7.421	156.97
125.6	52	3.57	7.127	150.47
127.4	53	3.44	6.846	144.26
129.2	54	3.32		138.35
131	55	3.21		132.70
132.8	56	3.10		127.31
134.6	57	2.99		122.16
136.4	58	2.89		117.25
138.2	59	2.79		112.56
140	60	2.70		108.08
141.8	61	2.61		103.80
143.6	62	2.52		99.70
145.4	63	2.44		95.79
147.2	64	2.36		92.06
149	65	2.28		88.48
150.8	66	2.21		85.06
152.6	67	2.14		81.79
154.4	68	2.07		78.66
156.2	69	2.00		75.67
158	70	1.94		72.80
159.8	71	1.88		70.06
161.6	72	1.82		67.43
163.4	73	1.76		64.91
165.2	74	1.71		62.50
167	75	1.65		60.19
168.8	76	1.60		57.98
170.6	77	1.55		55.86
172.4	78	1.51		53.82
174.2	79	1.46		51.87
176	80	1.41		50.00
177.8	81	1.37		48.21
179.6	82	1.33		46.48
181.4	83	1.29		44.83
183.2	84	1.25		43.25
185	85	1.22		41.72

°F	°C	Normal (KΩ) 10K SENSORS	23K SENSORS	50K SENSORS
186.8	86	1.18		40.26
188.6	87	1.14		38.85
190.4	88	1.11		37.50
192.2	89	1.08		36.21
194	90	1.05		34.96
195.8	91	1.02		33.77
197.6	92	0.99		32.62
199.4	93	0.96		31.51
201.2	94	0.93		30.45
203	95	0.91		29.42
204.8	96	0.88		28.44
206.6	97	0.86		27.50
208.4	98	0.83		26.59
210.2	99	0.81		25.71
212	100	0.79		24.87
213.8	101	0.76		24.06
215.6	102	0.74		23.28
217.4	103	0.72		22.52
219.2	104	0.70		21.80
221	105	0.68		21.10
222.8	106	0.67		20.43
224.6	107	0.65		19.78
226.4	108	0.63		19.16
228.2	109	0.61		18.56
230	110	0.60		17.98
231.8	111	0.58		17.42
233.6	112	0.57		16.88
235.4	113	0.55		16.36
237.2	114	0.54		15.85
239	115	0.52		15.37
240.8	116	0.51		14.90
242.6	117	0.50		14.45
244.4	118	0.48		14.01
246.2	119	0.47		13.59
248	120	0.46		13.19
249.8	121			12.80
251.6	122			12.42
253.4	123			12.05
255.2	124			11.70
257	125			11.35
258.8	126			11.02
260.6	127			10.70
262.4	128			10.40
264.2	129			10.10
266	130			9.81
267.8	131			9.53
269.6	132			9.26
271.4	133			9.00
273.2	134			8.74
275	135			8.50
276.8	136			8.26
278.6	137			8.03
280.4	138			7.81
282.2	139			7.60
284	140			7.39

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