VERTU MONO SPLIT DC INVERTER AIR CONDITIONER

SERVICE MANUAL

Mono DC

Revision A: 1305080001, Content updated.

Model Numbers:

MSV1-09HRFN1-MT0W **MSV1-12HRFN1- MT0W**

MSV1-12HRDN1-MQ0W **MSV1-18HRDN1-MQ0W**

MSV1-24HRDN1-MQ0W

Table of Contents

WARNING

- Installation MUST conform with local building codes or, in the absence of local codes, with the National Electrical Code NFPA70/ANSI C1-1993 or current edition and Canadian Electrical Code Part1 CSA C.22.1.
- The information contained in the manual is intended for use by a qualified service technician familiar with safety procedures and equipped with the proper tools and test instruments
- Installation or repairs made by unqualified persons can result in hazards to you and others.
- Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury and/or death.
- This service is only for service engineer to use.

R-410A

CONTENTS

1. Precaution

1.1 Safety Precaution

■ **To prevent injury to the user or other people and property damage, the following instructions must be followed.**

■ **Incorrect operation due to ignoring instruction will cause harm or damage.**

■ **Before service the unit, be sure to read this service manual at first.**

1.2 Warning

➢ Installation

■ **Do not use a defective or underrated circuit breaker. Use this appliance on a dedicated circuit.**

There is risk of fire or electric shock.

■ **For electrical work, contact the dealer, seller, a qualified electrician, or an authorized service center.**

Do not disassemble or repair the product, there is risk of fire or electric shock.

■ **Always ground the product.**

There is risk of fire or electric shock.

■ **Install the panel and the cover of control box securely.**

There is risk of fire of electric shock.

■ **Always install a dedicated circuit and breaker.**

Improper wiring or installation may cause electric shock.

■ **Use the correctly rated breaker of fuse.**

There is risk of fire or electric shock.

■ **Do not modify or extend the power cable.**

There is risk of fire or electric shock.

■ **Do not install, remove, or reinstall the unit by yourself (customer).**

There is risk of fire, electric shock, explosion, or injury.

■ **Be caution when unpacking and installing the product.**

Sharp edges could cause injury, be especially careful of the case edges and the fins on the condenser and evaporator.

■ **For installation, always contact the dealer or an authorized service center.**

■ **Do not install the product on a defective installation stand.**

■ **Be sure the installation area does not deteriorate with age.**

If the base collapses, the air conditioner could fall with it, causing property damage, product failure, and personal injury.

■ **Do not let the air conditioner run for a long time when the humidity is very high and a door or a window is left open.**

■ **Take care to ensure that power cable could not be pulled out or damaged during operation.**

There is risk of fire or electric shock.

■ **Do not place anything on the power cable.**

There is risk of fire or electric shock.

■ **Do not plug or unplug the power supply plug during operation.**

There is risk of fire or electric shock.

■ **Do not touch (operation) the product with wet hands.**

■ **Do not place a heater or other appliance near the power cable.**

There is risk of fire and electric shock.

■ **Do not allow water to run into electrical parts.**

It may cause fire, failure of the product, or electric shock.

■ **Do not store or use flammable gas or combustible near the product.**

There is risk of fire or failure of product.

■ **Do not use the product in a tightly closed space for a long time.**

Oxygen deficiency could occur.

■ **When flammable gas leaks, turn off the gas and open a window for ventilation before turn the product on.**

■ **If strange sounds or smoke comes from product, turn the breaker off or disconnect the power supply cable.**

There is risk of electric shock or fire.

■ **Stop operation and close the window in storm or hurricane. If possible, remove the product from the window before the hurricane arrives.**

There is risk of property damage, failure of product, or electric shock.

■ **Do not open the inlet grill of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)**

There is risk of physical injury, electric shock, or product failure.

■ **When the product is soaked, contact an authorized service center.**

There is risk of fire or electric shock.

■ **Be caution that water could not enter the product.**

There is risk of fire, electric shock, or product damage.

■ **Ventilate the product from time to time when operating it together with a stove etc.**

There is risk of fire or electric shock.

■ **Turn the main power off when cleaning or maintaining the product.**

There is risk of electric shock.

■ **When the product is not be used for a long time, disconnect the power supply plug or turn off the breaker.**

There is risk of product damage or failure, or unintended operation.

■ **Take care to ensure that nobody could step on or fall onto the outdoor unit.**

This could result in personal injury and product damage.

➢ CAUTION

■ **Always check for gas (refrigerant) leakage after installation or repair of product.**

Low refrigerant levels may cause failure of product.

■ **Install the drain hose to ensure that water is drained away properly.**

A bad connection may cause water leakage.

■ **Keep level even when installing the product.**

It can avoid vibration of water leakage.

■ **Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.**

It may cause a problem for your neighbors.

■ **Use two or more people to lift and transport the product.**

■ **Do not install the product where it will be exposed to sea wind (salt spray) directly.**

It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

➢ Operational

■ **Do not expose the skin directly to cool air for long time. (Do not sit in the draft).**

■ **Do not use the product for special purposes, such as preserving foods, works of art etc. It is a consumer air conditioner, not a precision refrigerant system.**

There is risk of damage or loss of property.

■ **Do not block the inlet or outlet of air flow.**

■ **Use a soft cloth to clean. Do not use harsh detergents, solvents, etc.**

There is risk of fire, electric shock, or damage to the plastic parts of the product.

■ **Do not touch the metal parts of the product when removing the air filter. They are very sharp.**

■ **Do not step on or put anything on the product. (outdoor units)**

■ **Always insert the filter securely. Clean the filter every two weeks or more often if necessary.**

A dirty filter reduces the efficiency of the air conditioner and could cause product malfunction or damage.

■ **Do not insert hands or other objects through air inlet or outlet while the product is operated.**

■ **Do not drink the water drained from the product.**

- **Use a firm stool or ladder when cleaning or maintaining the product.**

  Be careful and avoid personal injury.

- **Replace the all batteries in the remote control with new ones of the same type. Do not mix old and new batteries or different types of batteries.**

  There is risk of fire or explosion.

- **Do not recharge or disassemble the batteries. Do not dispose of batteries in a fire.**

  They may burn of explode.

- **If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water. Do not use the remote of the batteries have leaked.**

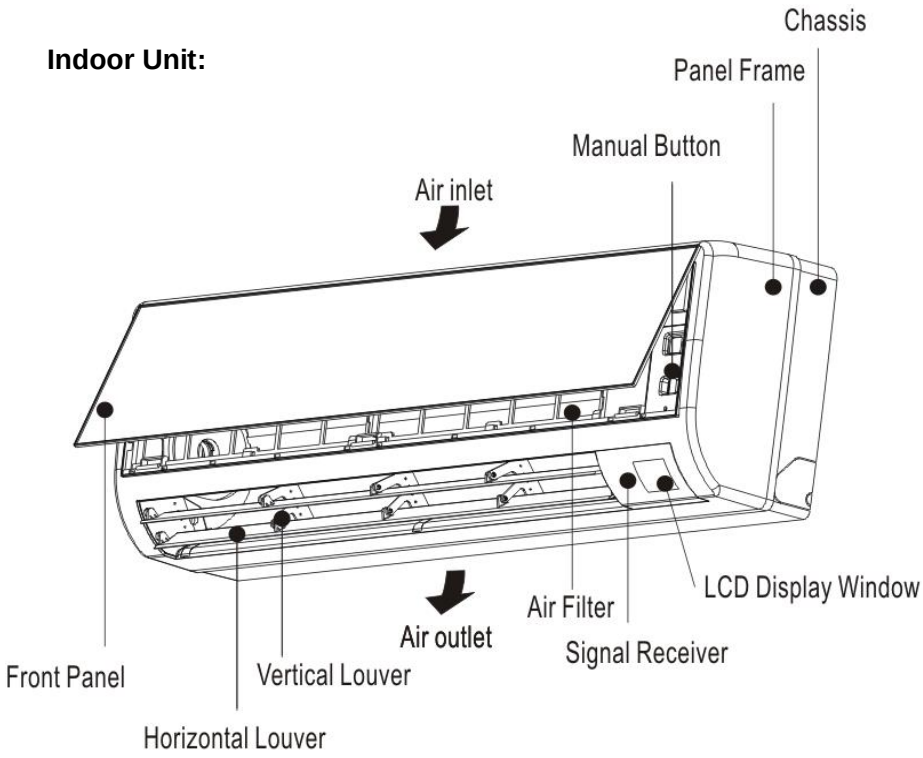
2. Part Names And Functions

2.1 Model Names of Indoor/Outdoor units

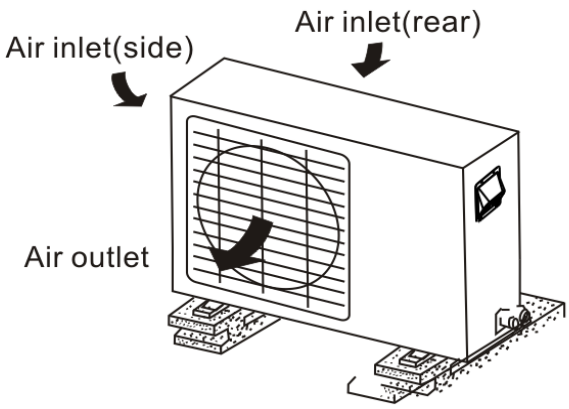
	Capacity	Indoor units	Outdoor units
DC Inverter	9k	MSV1-09HRFN1-MT0W	MOC-09HFN1-MT0W
	12k	MSV1-12HRFN1-MT0W	MOC-12HFN1-MT0W
		MSV1-12HRDN1-MQ0W	MOC-12HDN1-MQ0W
	18k	MSV1-18HRDN1-MQ0W	MOF-18HDN1-MQ0W
	24k	MSV1-24HRDN1-MQ0W	MOG-24HDN1-MQ0W

2.2 Part names of Indoor/Outdoor units

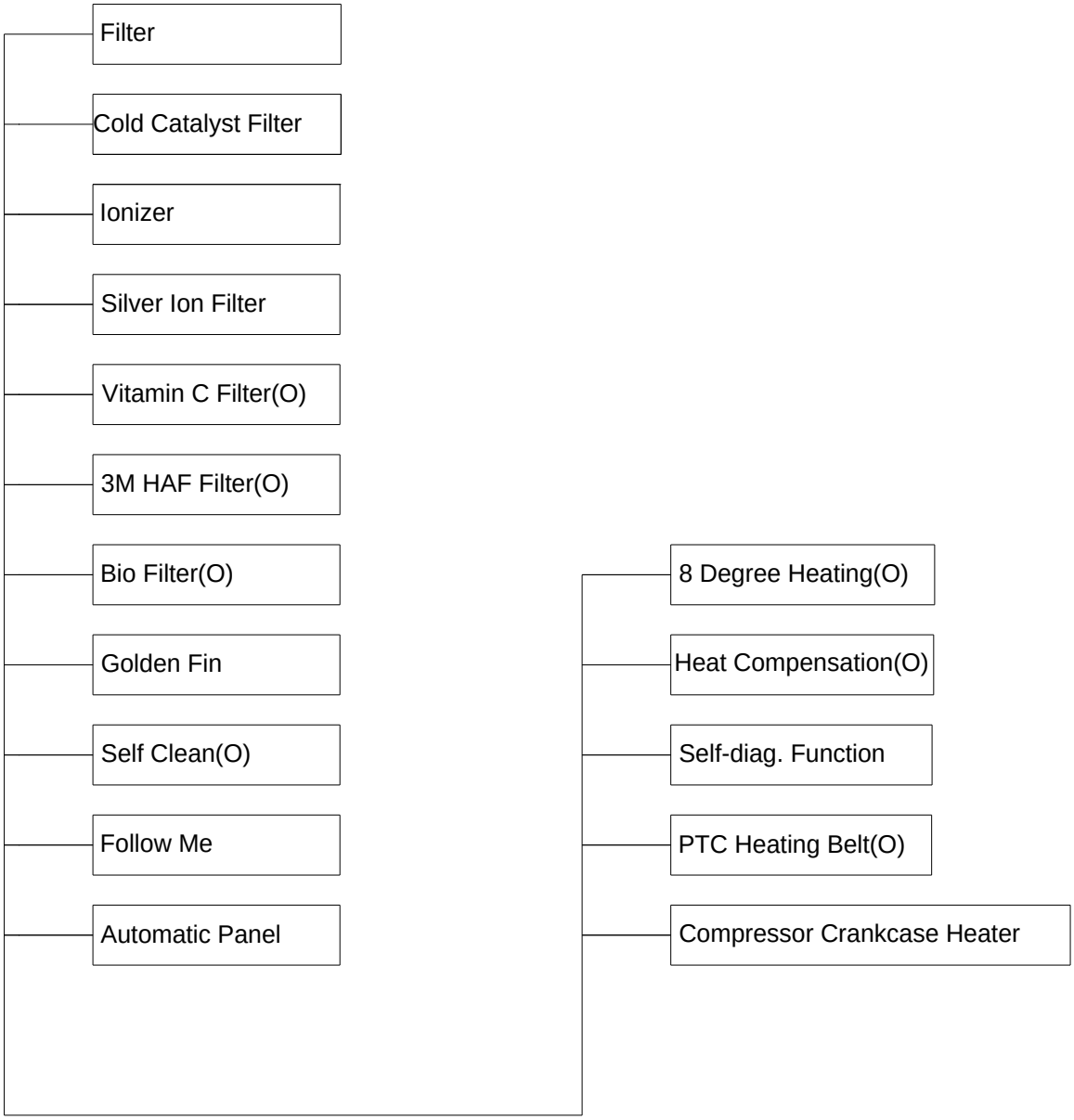
Indoor Unit:



Outdoor unit



2.3 Functions of Indoor/Outdoor units



O: optional function

- **Cold Catalyst Filter:**

Eliminate formaldehyde and other volatile organic compounds as well as harmful gases and odors.

- **Ionizer:**

Release negative ions, eliminate odor, dust, smoke and pollen particles to give you fresh and healthy air.

- **Silver Ion Filter:**

Sterilize bacteria effectively by decomposing cell wall of bacteria.

- **Vitamin C Filter:**

Release Vitamin C which can eliminate active oxygen to beautify the skin.

- **3M HAM Filter:**

Open-hole-structure with charged electrostatic effectively capture dust and particles, ensure maximum air flow and minimum pressure drop.

- **Bio Filter(O):**

Bio filter consists of a specialized biological enzyme and Eco filter. The Eco filter catches very small airborne dust particles and bacteria, fungi and microbes. Biological enzyme kills bacteria by dissolving their cell wall thus eliminating the problem of re-pollution.

- **Golden Fin:**

The Golden hydrophilic condenser can improve the heating efficiency by accelerating the defrosting process. The unique anticorrosive golden coating on the condenser can withstand the salty air, rain and other corrosive elements.

- **Self Clean:**

When this function is activated, firstly the indoor unit operates as Fan-only mode with low fan speed, during this period the condensed water will take some dust on evaporator fins away. After that the unit turns to heating operation with low fan speed which dries the inside of indoor unit. Finally it turns to fan-only mode and blows away the wet air. The whole process cleans the internal side of indoor unit and prevents the breeding of bacteria.

- **Follow me:**

With this technology, a temperature sensor is built in the remote control when you stay close to the remote control, the unit will automatically change the operation mode to supply comfortable temperature just like the air conditioner is following you.

- **Automatic panel:**

There is a stepper motor in the frame assembly, when the AC is switched on, it can drive gear, open the top panel to increase air volume.

- **8 Degree Heating:**

In heating operation, the preset temperature of the air conditioner can be as lower as 8° C, which keeps the room temperature steady at 8° C for in winter.

- **Heat compensation:**

Based on different installation height of indoor unit, the temperature deviation of the sensor sensed against the actual floor temperature always is different. Changing the jumping wires combination on the indoor PCB is possible to compensate the deviation. This could be achieved by installer in the installation field.

- **Self-diag.Function:**

Monitoring some abnormal operations or parts failures, microcomputer of the air conditioner will switch off and protect the system automatically.Meanwhile, the error or protection code will be displayed on the indoor unit.

- **PTC heating belt:**

With a PTC heating belt fitted on the base plate of the outdoor unit, the rain, snow or defrosted water accumulating on the base plate is avoided.

- **Compressor crankcase heater:**

The oil dissolves easily in refrigerant, especially in low temperature condition. The crankcase heating belt can heat the bottom of the compressor to avoid pumping out too much oil with the refrigerant, which helps to protect the compressor.

3. Specification

Code			2T0032300361	2T0032500279
Indoor code			220032304710	220032503610
Outdoor code			220037303660	220037503660
Indoor model			MSV1-09HRFN1-MT0W	MSV1-12HRFN1- MT0W
Outdoor model			MOC-09HFN1-MT0W	MOC-12HFN1-MT0W
Power supply		Ph-V-Hz	1Ph, 208-230V～, 60Hz	1Ph, 208-230V～, 60Hz
MINIMUM CIRCUIT AMPACITY		A	15	15
MAX.FUSE		A	20	20
Moisture removal		L/h	1.0	1.2
Compressor	Model		DA108X1C-20FZ3	DA108X1C-20FZ3
	Type		ROTARY	ROTARY
	Brand		GMCC	GMCC
	Capacity	Btu/h	10918	10918
	Input	W	855	855
	Rated current(RLA)	A	5.3	5.3
	Locked rotor Amp(LRA)	A	10	10
	Thermal protector		INT01L-4639 / CS-74	INT01L-4639 / CS-74
	Thermal protector position		EXTERNAL	EXTERNAL
	Capacitor	uF	35	35
	Refrigerant oil/oil charge	ml	ESTER OIL VG74 / 480	ESTER OIL VG74 / 480
Indoor fan motor	Model		WZDK20-38G	WZDK20-38G
	Brand		Panasonic	Panasonic
	Input	W	20(Output)	20(Output)
	RLA	A	0.06	0.06
	LRA	A	/	/
	Winding Resistance	Ω	/	/
	Capacitor	uF	----	----
	Speed(Hi/Mi/Lo)	r/min	1250/1000/900	1250/1000/900
Indoor unit	Dimension(W*D*H)	mm	845x165x286	845x165x286
	Dimension(W*D*H)	inch	33.27x6.50x11.26	33.27x6.50x11.26
	Packing (W*D*H)	mm	905x285x355	905x285x355
	Packing (W*D*H)	inch	35.63x11.22x13.98	35.63x11.22x13.98
	Net/Gross weight	Kg	9/11	9/11
	Net/Gross weight	lbs.	19.84/24.25	19.84/24.25
Outdoor fan motor	Model		WZDK35-38G	WZDK35-38G
	Brand		Panasonic	Panasonic
	Input	W	35(Output)	35(Output)
	RLA	A	0.15	0.15
	LRA	A	/	/
	Winding Resistance	Ω	/	/
	Capacitor	uF	----	----

	Speed	r/min	800	800
Outdoor unit	Dimension(W*D*H)	mm	760x285x590	760x285x590
	Dimension(W*D*H)	inch	29.92x11.22x23.23	29.92x11.22x23.23
	Packing (W*D*H)	mm	887x355x645	887x355x645
	Packing (W*D*H)	inch	34.92x13.98x25.39	34.92x13.98x25.39
	Net/Gross weight	Kg	38.5/41	39.5/42
	Net/Gross weight	lbs.	84.88/90.39	87.08/92.59
Refrigerant type		g	R410A/1100g	R410A/1250g
Refrigerant type		oz	R410A/38.8	R410A/44.1
Design pressure		PSIG	550/340 PSIG	550/340 PSIG
Application area		m2	13-22	18-29
Application area		sq.ft	140-237	194-312

Code			2T0032500244	2T0032700154
Indoor code			220032503340	220032702340
Outdoor code			220037502530	220037701530
Inoor model			MSV1-12HRDN1-MQ0W	MSV1-18HRDN1-MQ0W
Outdoor model			MOC-12HDN1-MQ0W	MOF-18HDN1-MQ0W
Power supply		Ph-V-Hz	1Ph, 208-230V～, 60Hz	1Ph, 208-230V～, 60Hz
MINIMUM CIRCUIT AMPACITY		A	15	15
MAX.FUSE		A	20	20
Moisture Removal		L/h	1.2	1.8
Compressor	Model		DA108X1C-20FZ3	DA150S1C-20FZ
	Type		ROTARY	Twin-rotary
	Brand		GMCC	GMCC
	Capacity	Btu/h	10918	15286
	Input	W	855	1150
	Rated current(RLA)	A	5.3	9.7
	Locked rotor Amp(LRA)	A	10	----
	Thermal protector		INT01L-4639 / CS-74	----
	Thermal protector position		EXTERNAL	----
	Capacitor	uF	35	35
	Refrigerant oil/oil charge	ml	ESTER OIL VG74 / 480	ESTER OIL VG74/500
Indoor fan motor	Model		RPG20B	YDK36-4CB(A)
	Brand		Welling	Welling
	Input	W	43	79/58/50
	RLA	A	0.2	0.39
	LRA	A	0.23	0.48
	Winding Resistance	Ω	381/267	242/79
	Capacitor	uF	1.5	3
	Speed(Hi/Mi/Lo)	r/min	1250/1060/900	1245 / 1040 / 940
Indoor unit	Dimension(W*D*H)	mm	845x165x286	1082x207x320
	Dimension(W*D*H)	inch	33.27x6.50x11.26	42.60x8.15x12.60
	Packing (W*D*H)	mm	905x285x355	1180x425x310
	Packing (W*D*H)	inch	35.63x11.22x13.98	46.46x16.73x12.20
	Net/Gross weight	Kg	10/13.5	14.5/20
	Net/Gross weight	lbs.	22.05/29.76	31.97/44.09
Outdoor fan motor	Model		YDK24-6GB	YDK53-6FB
	Brand		Welling	Welling
	Input	W	72/53	166/105
	RLA	A	0.33	0.74
	LRA	A	0.41	0.95
	Winding Resistance	Ω	293/169	56/76
	Capacitor	uF	2.5	2.5
	Speed	r/min	830/570	800/600
Outdoor unit	Dimension(W*D*H)	mm	760x285x590	845x320x700
	Dimension(W*D*H)	inch	29.92x11.22x23.23	33.27x12.60x27.56

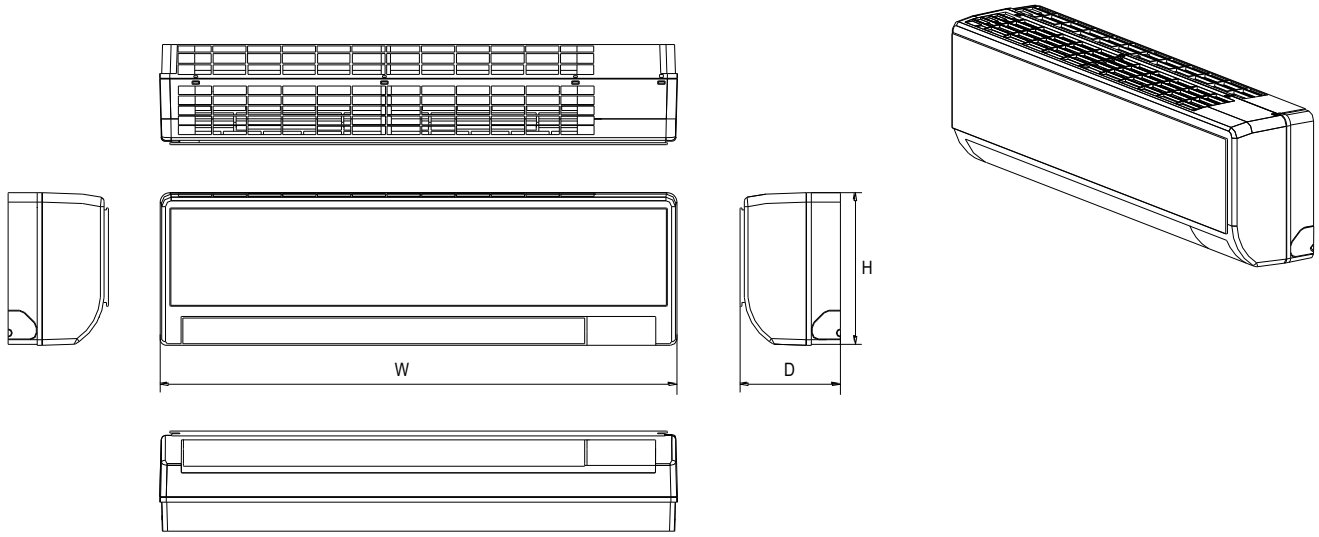
	Packing (W*D*H)	mm	887x355x645	965x395x755
	Packing (W*D*H)	inch	34.92x13.98x25.39	37.99x15.55x29.72
	Net/Gross weight	Kg	39/41.5	50/54
	Net/Gross weight	lbs.	85.98/91.49	110.23/119.05
Refrigerant type		g	R410A/1100g	R410A/1650g
Refrigerant type		oz	R410A/38.8	R410A/58.2
Design pressure		PSIG	550/340 PSIG	550/340 PSIG
Application area		m2	18-29	26-44
Application area		sq.ft	194-312	280-474

Code			2T0033000227
Indoor code			220033002880
Outdoor code			220038002170
Inoor model			MSV1-24HRDN1-MQ0W
Outdoor model			MOG-24HDN1-MQ0W
Power supply		Ph-V-Hz	1Ph, 208-230V～, 60Hz
MINIMUM CIRCUIT AMPACITY		A	15
MAX.FUSE		A	20
Moisture Removal		L/h	2.5
Compressor	Model		DA150S1C-20FZ
	Type		Twin-rotary
	Brand		GMCC
	Capacity	Btu/h	15286
	Input	W	1150
	Rated current(RLA)	A	9.7
	Locked rotor Amp(LRA)	A	----
	Thermal protector		----
	Thermal protector position		----
	Capacitor	uF	35
	Refrigerant oil/oil charge	ml	ESTER OIL VG74/500
Indoor fan motor	Model		YDK36-4CB(A)
	Brand		Welling
	Input	W	79/58/50
	RLA	A	0.39
	LRA	A	0.48
	Winding Resistance	Ω	242/79
	Capacitor	uF	3
	Speed(Hi/Mi/Lo)	r/min	1245 / 1040 / 940
Indoor unit	Dimension(W*D*H)	mm	1082x207x320
	Dimension(W*D*H)	inch	42.60x8.15x12.60
	Packing (W*D*H)	mm	1180x425x310
	Packing (W*D*H)	inch	46.46x16.73x12.20
	Net/Gross weight	Kg	14.5/20
	Net/Gross weight	lbs.	31.97/44.09
Outdoor fan motor	Model		YDK53-6NB
	Brand		Welling
	Input	W	157.3/93.8
	RLA	A	0.75
	LRA	A	0.989
	Winding Resistance	Ω	56.5/117.5
	Capacitor	uF	2.5
	Speed	r/min	790/540
Outdoor unit	Dimension(W*D*H)	mm	900x315x860
	Dimension(W*D*H)	inch	35.43x12.40x33.86

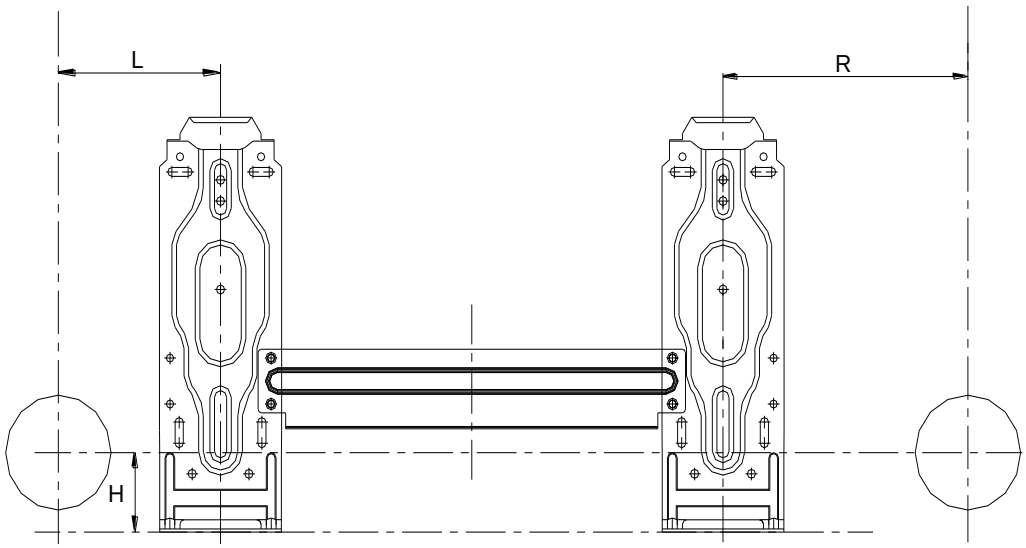
	Packing (W*D*H)	mm	1043x395x915
	Packing (W*D*H)	inch	41.06x15.55x36.02
	Net/Gross weight	Kg	62/67
	Net/Gross weight	lbs.	136.69/147.71
Refrigerant type		g	R410A/1900g
Refrigerant type		oz	R410A/67.0
Design pressure		PSIG	550/340 PSIG
Application area		m2	34-56
Application area		sq.ft	366-603

4. Dimension

4.1 Indoor Unit

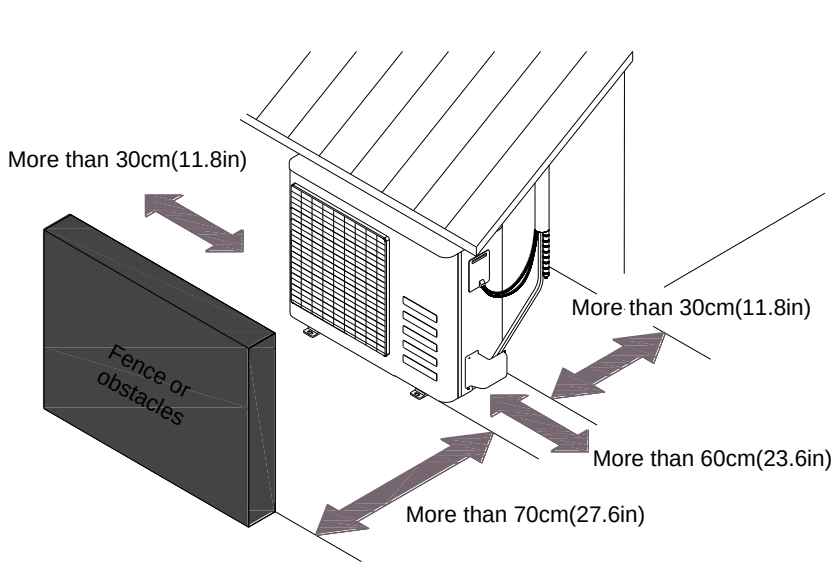


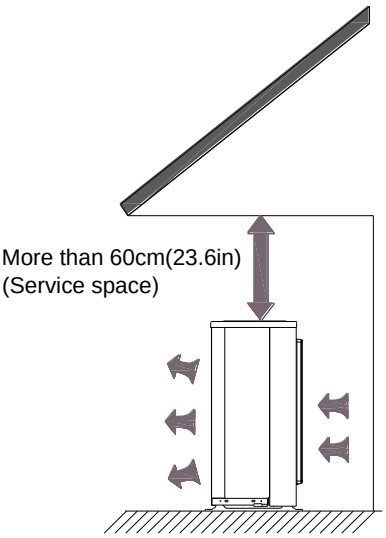
Model	W	D	H
MSV1-09HRFN1-MT0W	845mm (33.27in)	165mm (6.5in)	286mm (11.26in)
MSV1-12HRFN1- MT0W			
MSV1-12HRDN1-MQ0W			
MSV1-18HRDN1-MQ0W	1082mm (42.60in)	207mm (8.15in)	320mm (12.60in)
MSV1-24HRDN1-MQ0W			

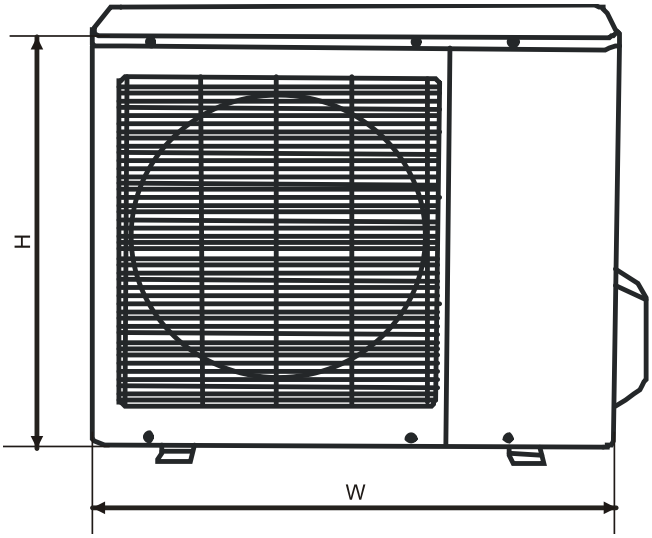


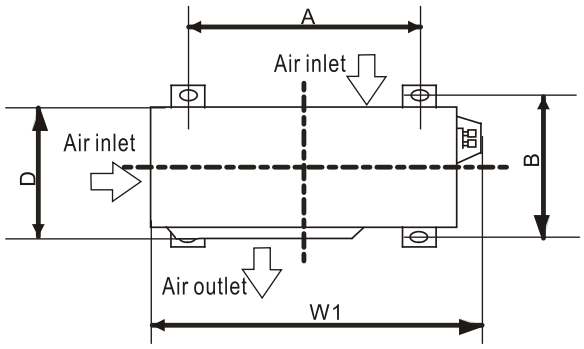
Model	R	L	H	Dimension of installation hole
MSV1-09HRFN1-MT0W	186mm (7.32in)	150mm (5.91in)	45mm (1.77in)	Φ65mm(2.56in)
MSV1-12HRFN1- MT0W				
MSV1-12HRDN1-MQ0W				
MSV1-18HRDN1-MQ0W	138.5mm (5.45in)	150mm (5.91in)	45mm (1.77in)	
MSV1-24HRDN1-MQ0W				

4.2 Outdoor Unit





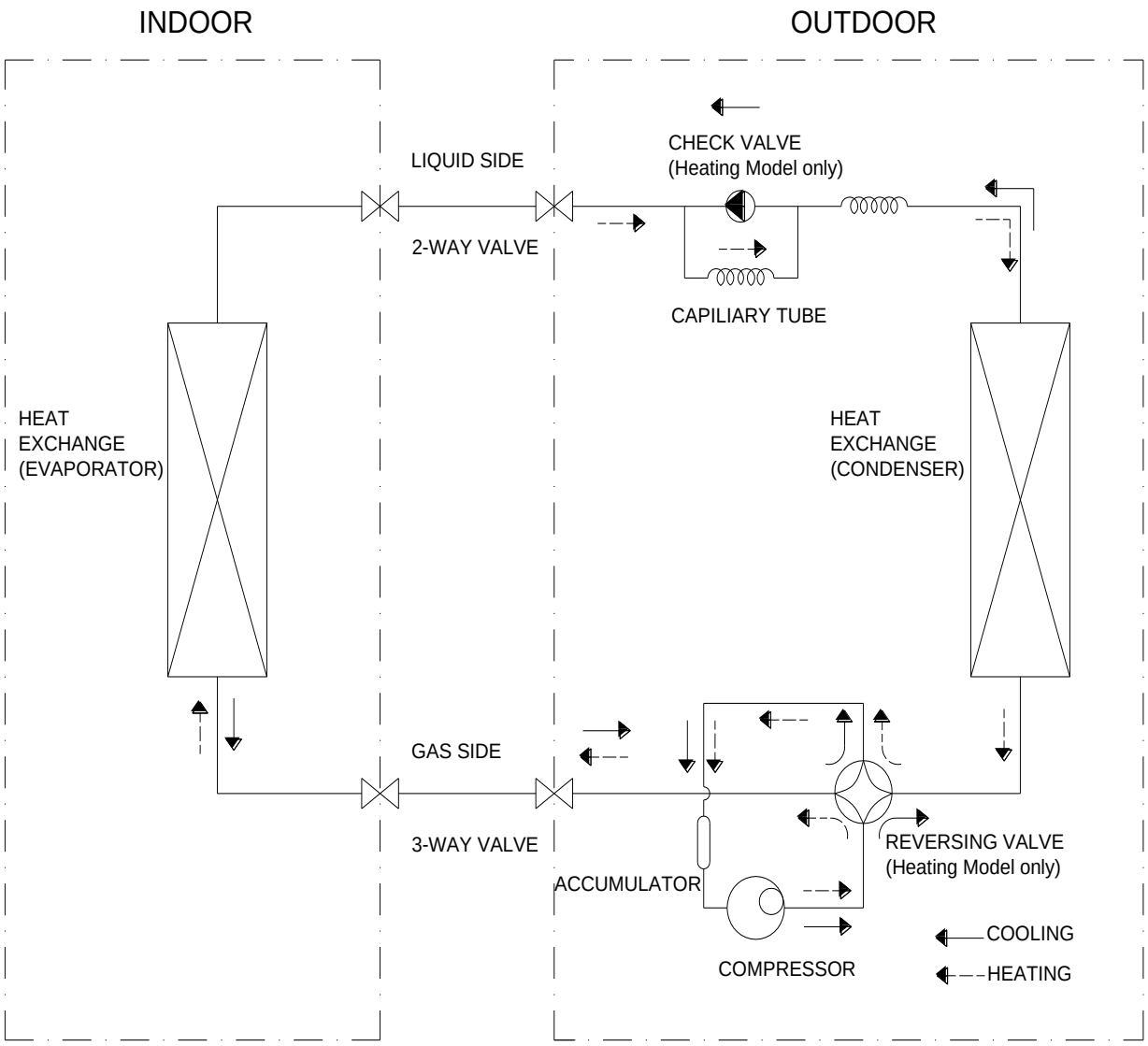




Note: The above drawing is only for reference. The appearance of your units may be different.

Model	W	D	H	W1	A	B
MOC-09HFN1-MT0W	760mm (29.92in)	285mm (11.22in)	590mm (23.23in)	823mm (32.40in)	530mm (20.87in)	290mm (11.42in)
MOC-12HFN1-MT0W						
MOC-12HDN1-MQ0W						
MOF-18HDN1-MQ0W	845mm (33.27in)	320mm (12.60in)	700mm (27.56in)	908mm (35.75in)	560mm (22.05in)	335mm (13.19in)
MOG-24HDN1-MQ0W	900mm (35.43in)	315mm (12.40in)	860mm (33.86in)	980mm (38.58in)	590mm (23.23in)	333mm (13.11in)

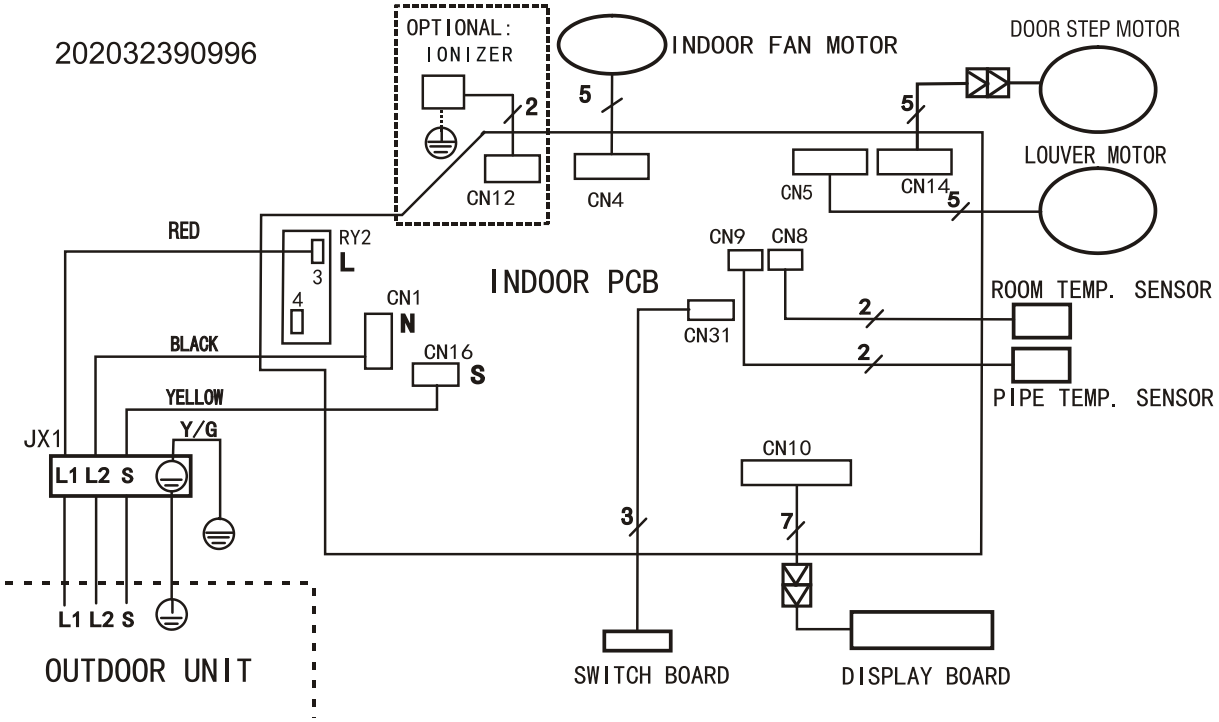
5. Refrigerant Cycle Diagram



6. Wiring Diagram

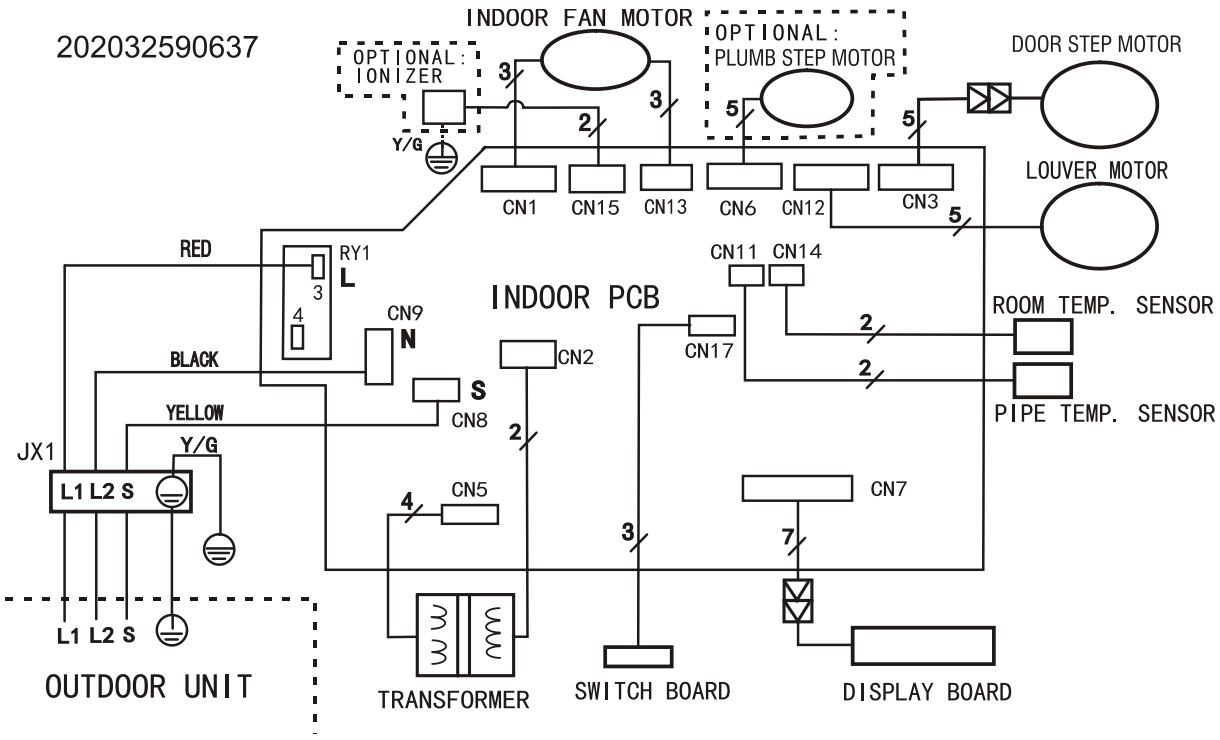
6.1 Indoor Unit

MSV1-09HRFN1-MT0W, MSV1-12HRFN1-MT0W



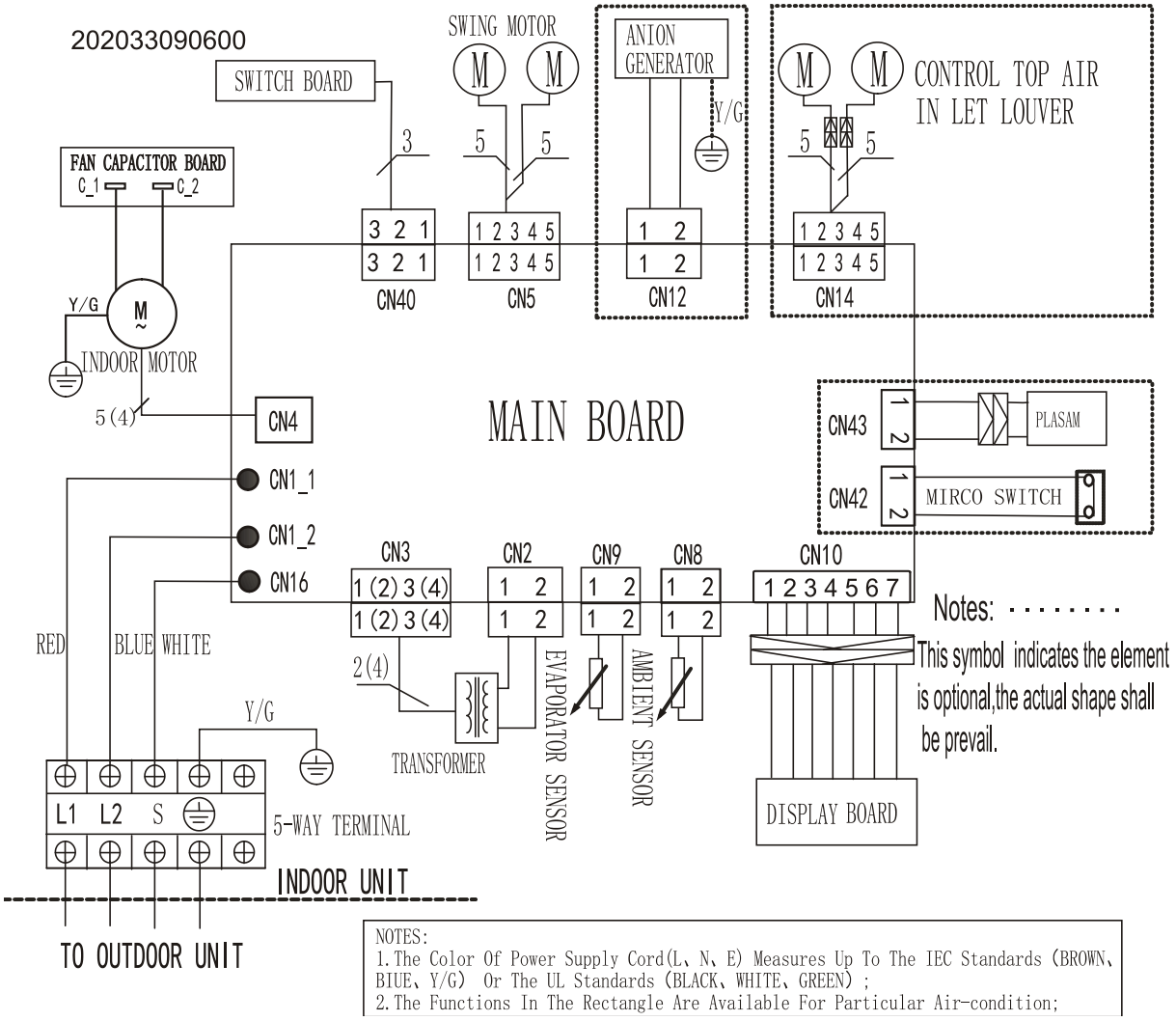
Notes: ····· This symbol indicates the element is optional,the actual shape shall be prevail.

MSV1-12HRDN1-MQ0W



Notes: ····· This symbol indicates the element is optional,the actual shape shall be prevail.

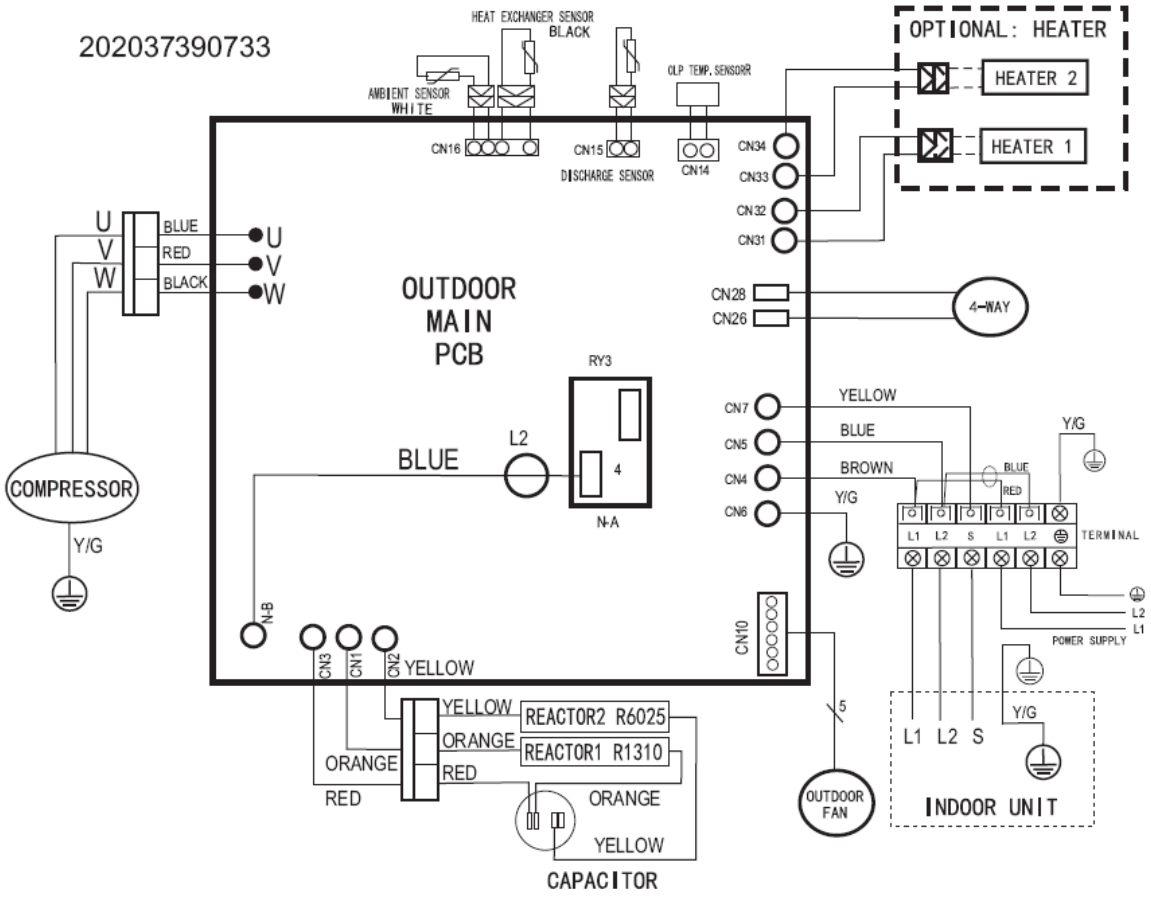
MSV1-18HRDN1-MQ0W, MSV1-24HRDN1-MQ0W



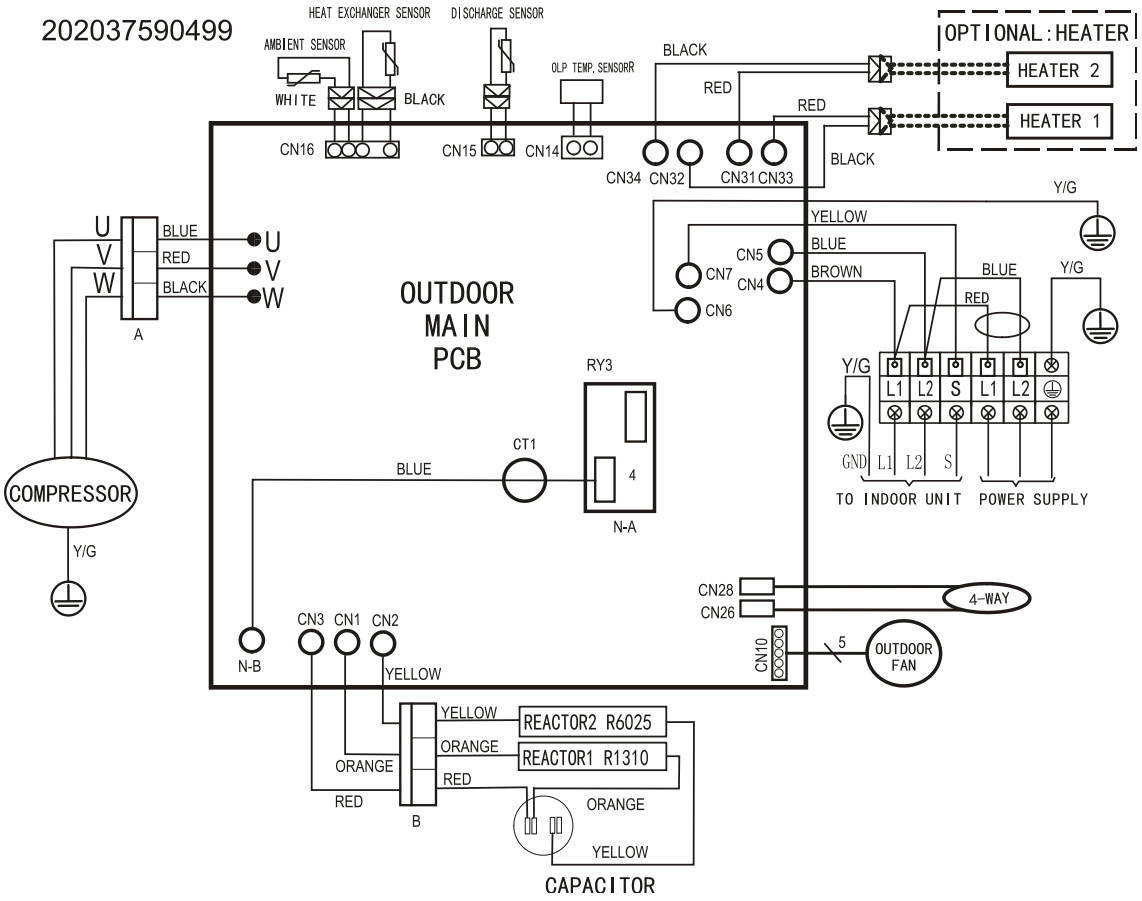
NOTES:
1.The Color Of Power Supply Cord(L、N、E) Measures Up To The IEC Standards (BROWN、BIUE、Y/G) Or The UL Standards (BLACK、WHITE、GREEN) ;
2.The Functions In The Rectangle Are Available For Particular Air-condition;

6.2 Outdoor Unit

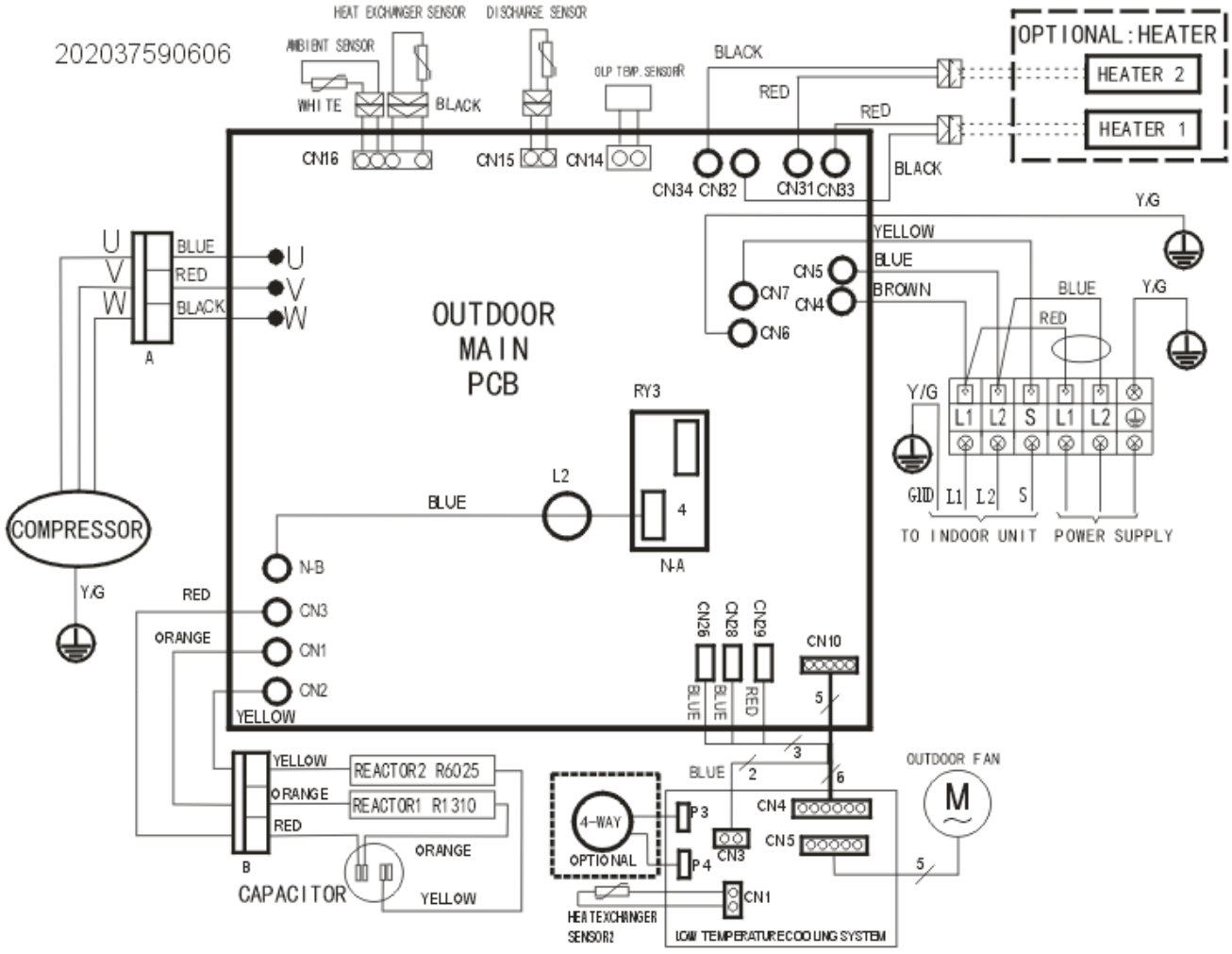
MOC-09HFN1-MTOW, MOC-12HFN1-MTOW



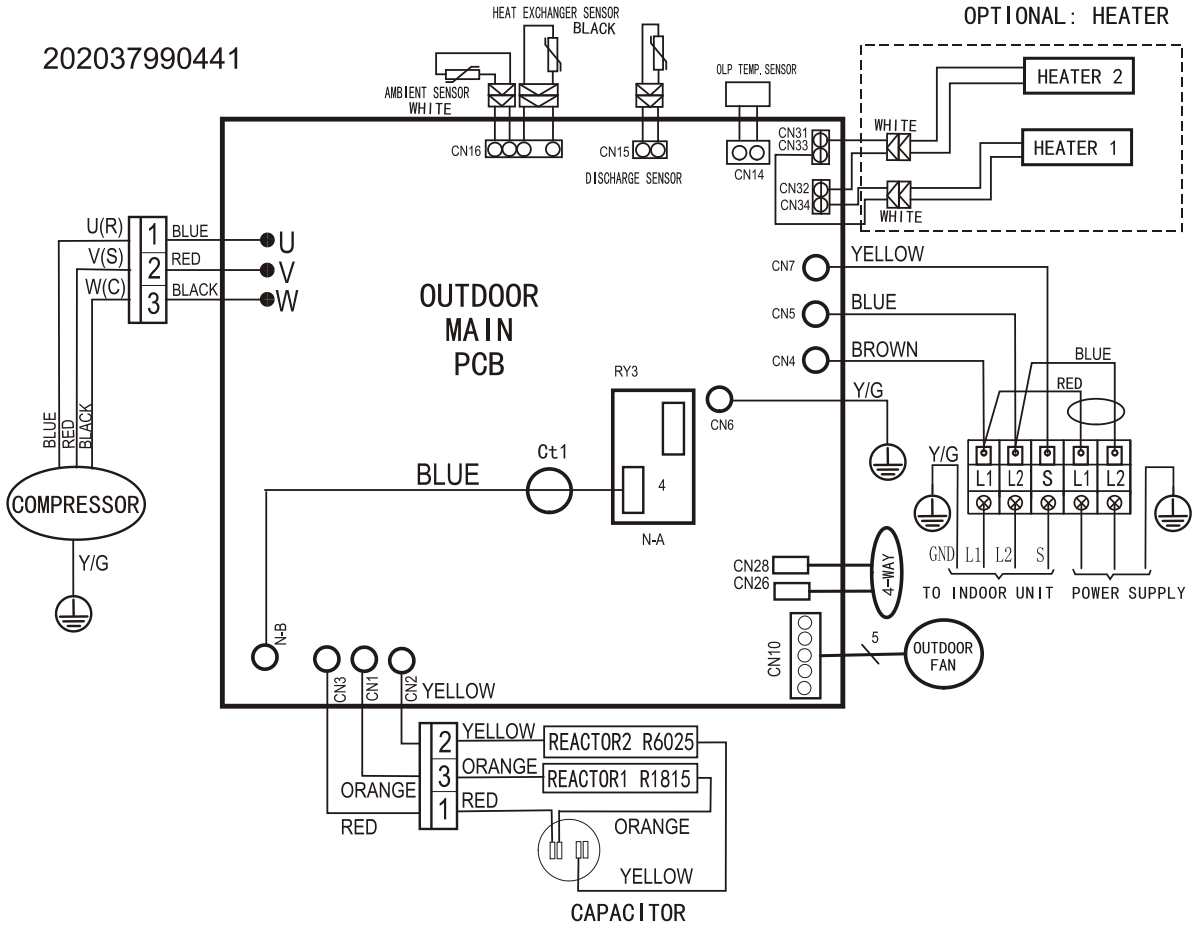
MOC-12HDN1-MQ0W



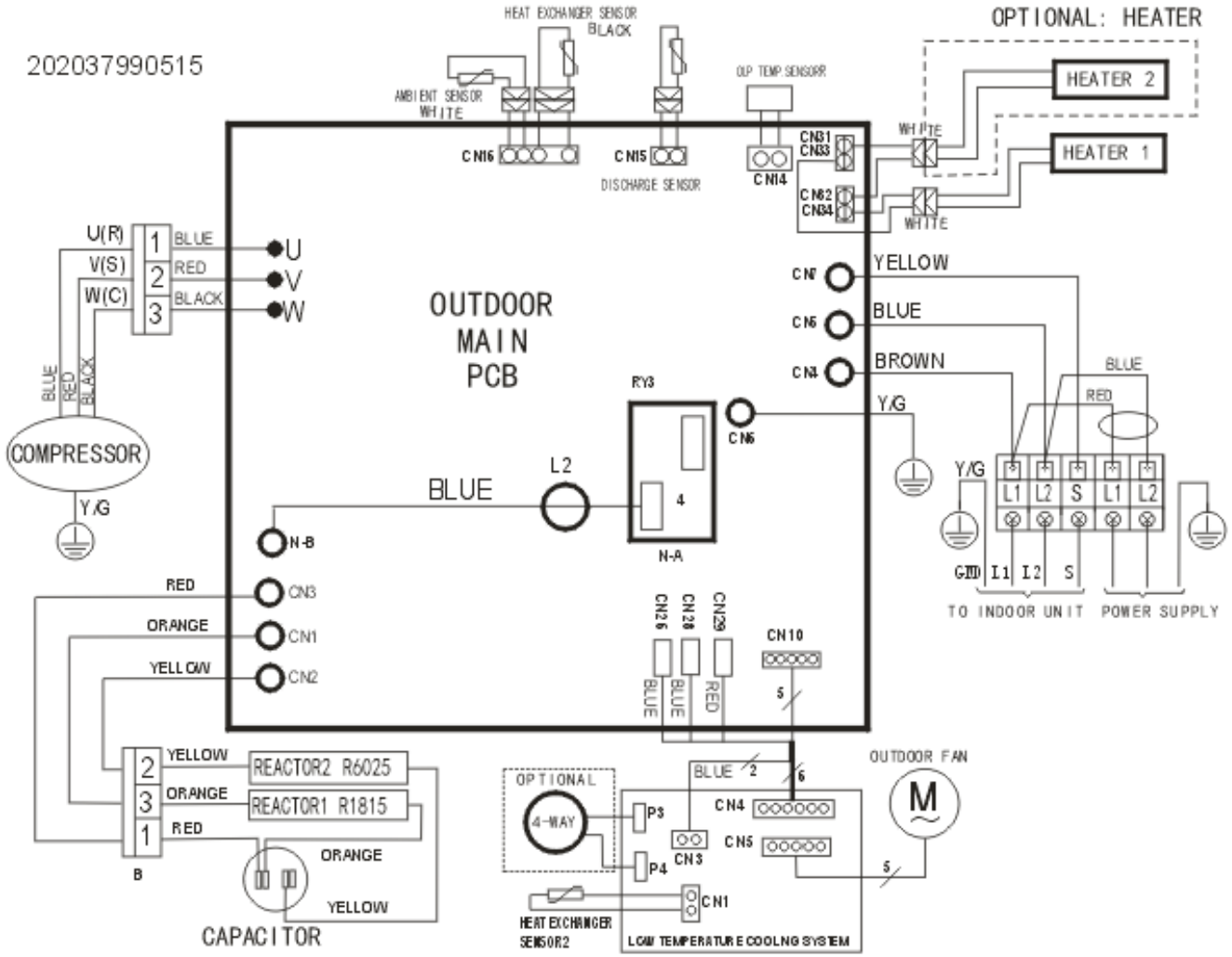
MOC-12HDN1-MQ0W with low ambient temp. cooling function



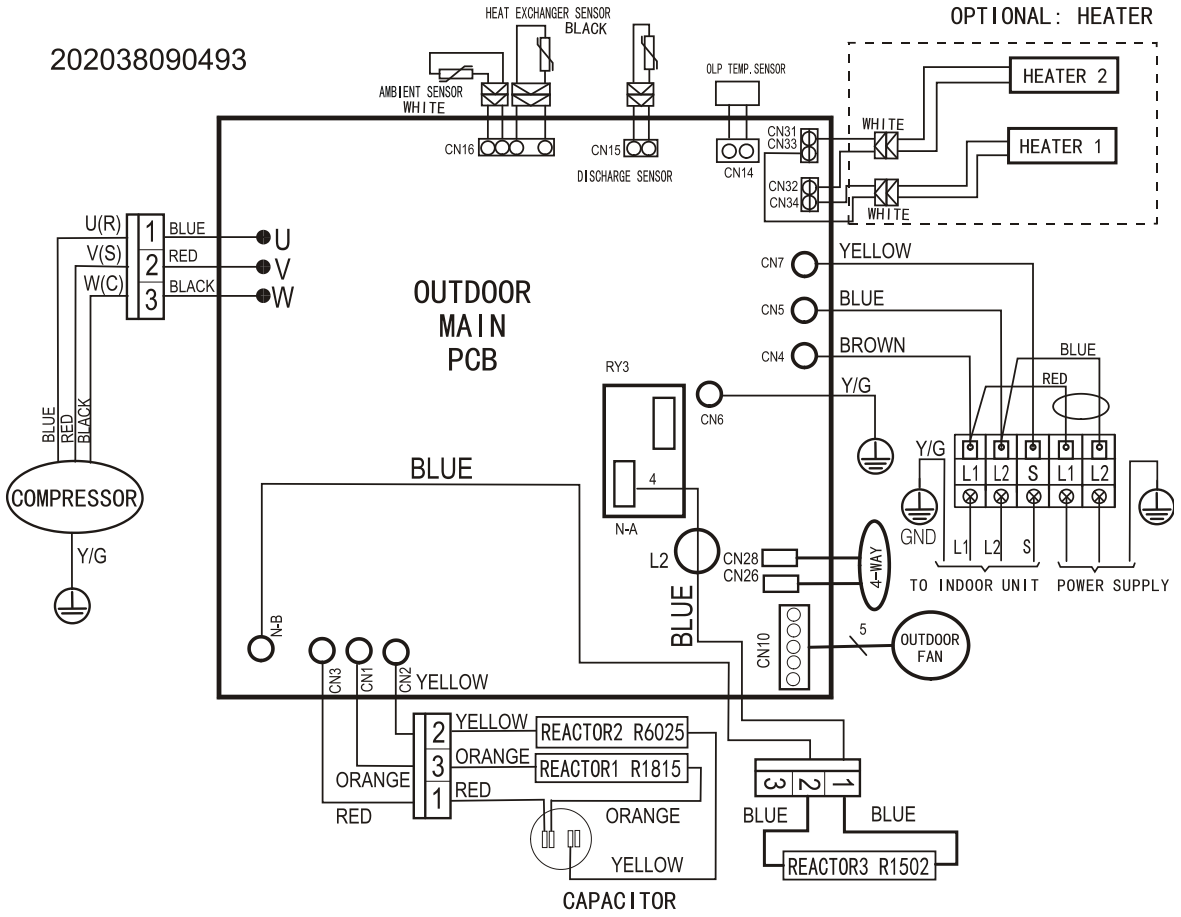
MOF-18HDN1-MQ0W



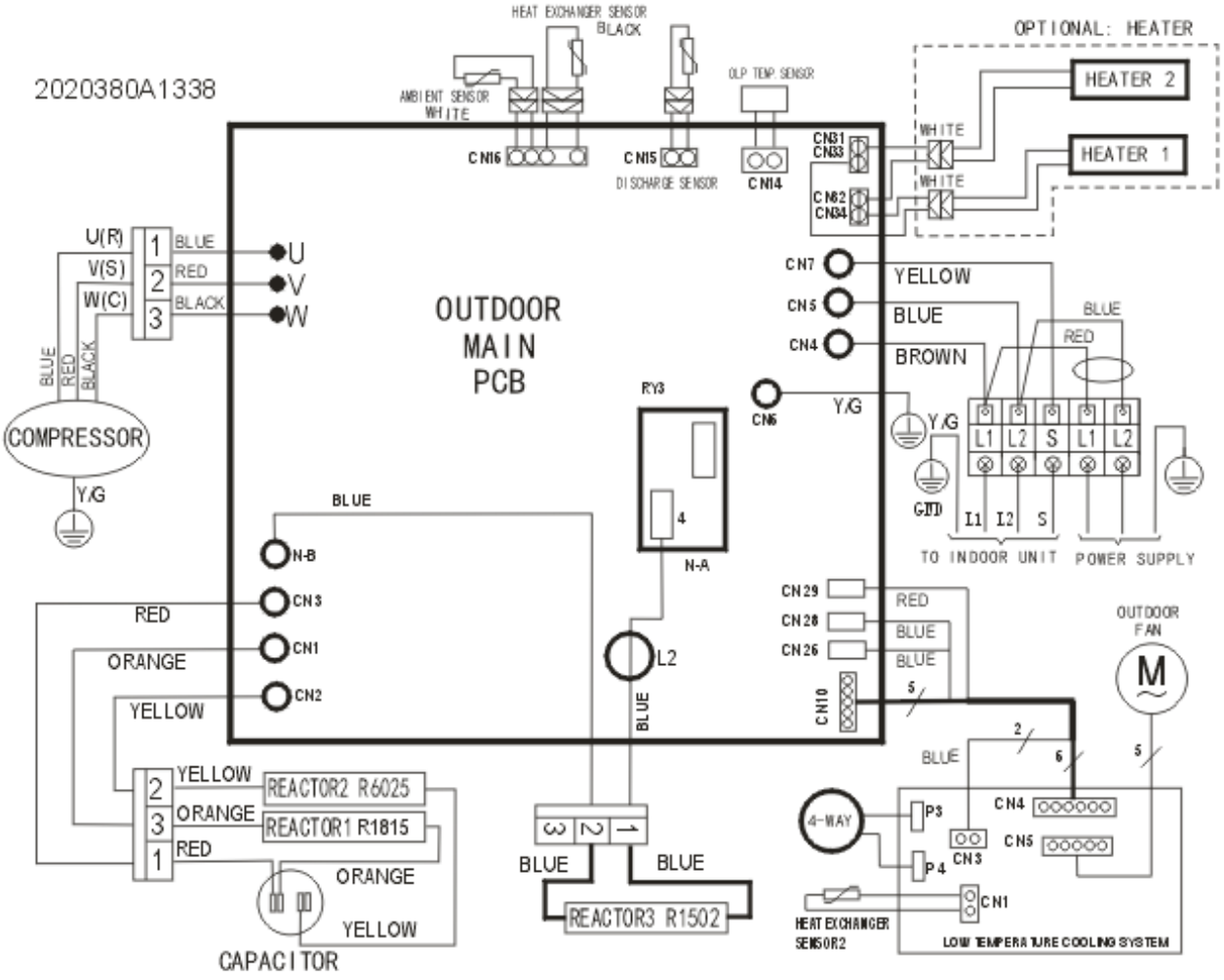
MOF-18HDN1-MQ0W with low ambient temp. cooling function



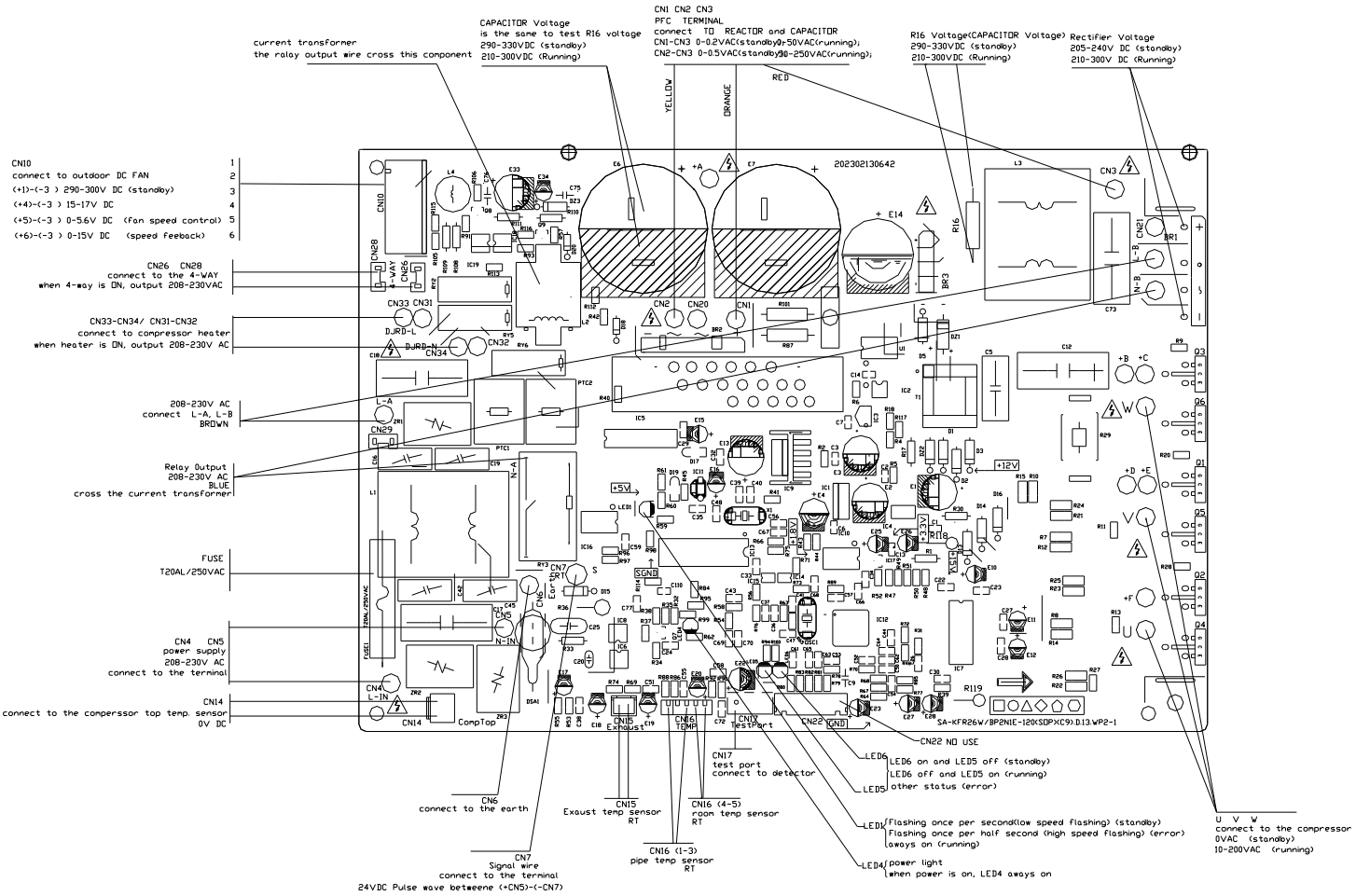
MOG-24HDN1-MQOW



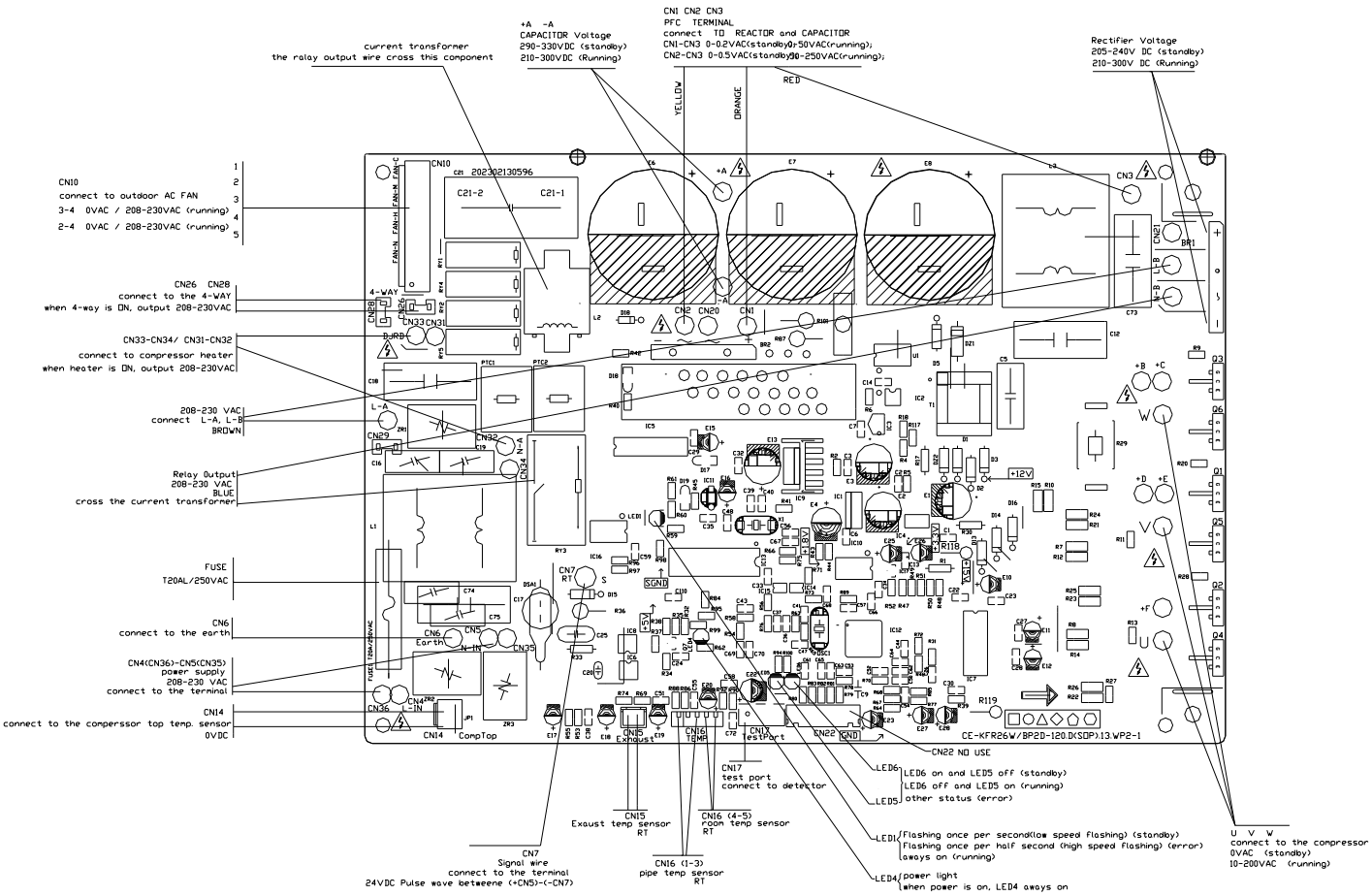
MOG-24HDN1-MQOW with low ambient temp. cooling function



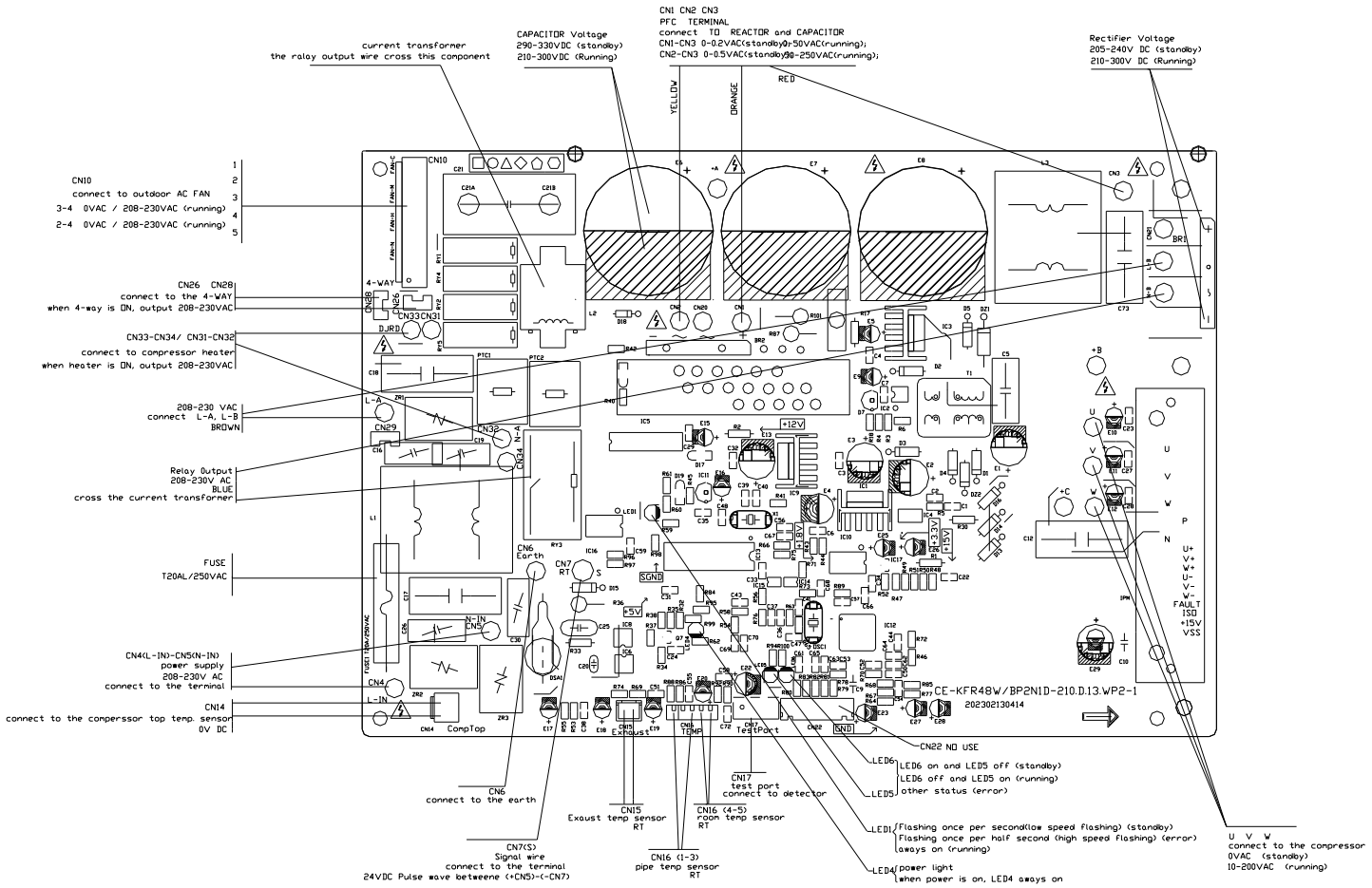
MOC-09HFN1-MTOW, MOC-12HFN1-MTOW



MOC-12HDN1-MQ0W



MOF-18HDN1-MQ0W, MOG-24HDN1-MQOW



7 Installation Details

7.1 Wrench torque sheet for installation

Outside diameter		Torque	Additional tightening torque
Φ6.35mm	1/4in	1500N.cm(153kgf.cm)	1600N.cm(163kgf.cm)
Φ9.52mm	3/8in	2500N.cm(255kgf.cm)	2600N.cm(265kgf.cm)
Φ12.7mm	1/2in	3500N.cm(357kgf.cm)	3600N.cm(367kgf.cm)
Φ15.9mm	5/8in	4500N.cm(459kgf.cm)	4700N.cm(479kgf.cm)
Φ19mm	3/4in	6500N.cm(663kgf.cm)	6700N.cm(683kgf.cm)

7.2 Connecting the cables

The power cord should be selected according to the following specifications sheet.

Appliance Amps	AWG Wire Size
10	18
13	16
18	14
25	12
30	10

The cable size and the current of the fuse or switch are determined by the maximum current indicated on the nameplate which located on the side panel of the unit. Please refer to the nameplate before selecting the cable, fuse and switch.

7.3 Pipe length and the elevation

Models	Pipe size	
	Gas	Liquid
MSV1-09HRFN1-MT0W+MOC-09HFN1-MT0W	3/8in (Φ9.52mm)	1/4in (Φ6.35mm)
MSV1-12HRFN1-MT0W+MOC-12HFN1-MT0W	1/2in (Φ12.7mm)	1/4in (Φ6.35mm)
MSV1-12HRDN1-MQ0W+MOC-12HDN1-MQ0W		
MSV1-18HRDN1-MQ0W+MOF-18HDN1-MQ0W	1/2in (Φ12.7mm)	1/4in (Φ6.35mm)
MSV1-24HRDN1-MQ0W+MOG-24HDN1-MQ0W	5/8in (Φ15.9mm)	3/8in (Φ9.52mm)

Models	Standard length	Max. Elevation	Max. Length A	Additional refrigerant
MSV1-09HRFN1-MT0W+ MOC-09HFN1-MT0W	7.5m (0.3in)	10m (0.39in)	25m (0.98in)	20g/m
MSV1-12HRFN1-MT0W+ MOC-12HFN1-MT0W	7.5m (0.3in)	10m (0.39in)	25m (0.98in)	20g/m
MSV1-12HRDN1-MQ0W+ MOC-12HDN1-MQ0W				
MSV1-18HRDN1-MQ0W+ MOF-18HDN1-MQ0W	7.5m (0.3in)	20m (0.79in)	30m (1.18in)	40g/m
MSV1-24HRDN1-MQ0W+ MOG-24HDN1-MQ0W	7.5m (0.3in)	25m (0.98in)	50m (1.97in)	40g/m

7.4 Installation for the first time

Air and moisture in the refrigerant system have undesirable effects as below:

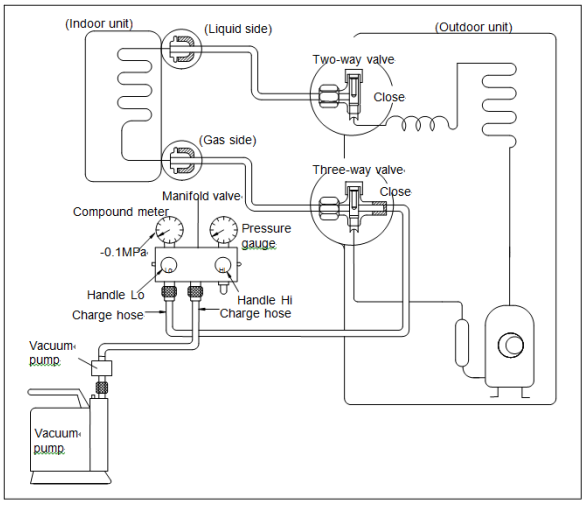
- Pressure in the system rises.
- Operating current rises.
- Cooling or heating efficiency drops.
- Moisture in the refrigerant circuit may freeze and block capillary tubing.
- Water may lead to corrosion of parts in the refrigerant system.

Therefore, the indoor units and the pipes between indoor and outdoor units must be leak tested and evacuated to remove gas and moisture from the system.

Gas leak check (Soap water method):

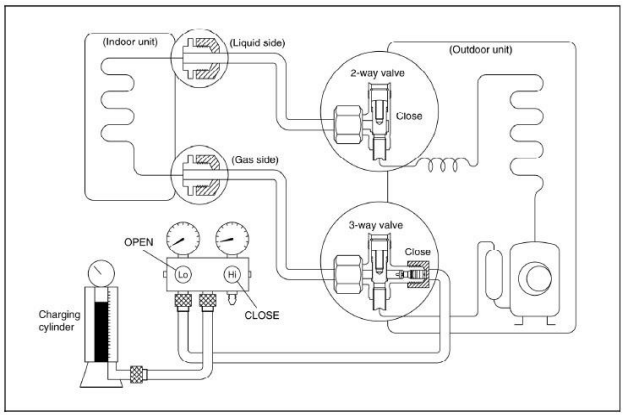
Apply soap water or a liquid neutral detergent on the indoor unit connections or outdoor unit connections by a soft brush to check for leakage of the connecting points of the piping. If bubbles come out, the pipes have leakage.

1. Air purging with vacuum pump



1) Completely tighten the flare nuts of the indoor and outdoor units, confirm that both the 2-way and 3-way valves are set to the closed position.
2) Connect the charge hose with the push pin of handle lo to the 3-way valves gas service port..
3) Connect the charge hose of handle hi connection to the vacuum pump.
4) Fully open the handle Lo of the manifold valve.
5) Operate the vacuum pump to evacuate.
6) Make evacuation for 30 minutes and check whether the compound meter indicates -0.1Mpa(14.5Psi). If the meter does not indicate -0.1Mpa(14.5Psi) after pumping 30 minutes, it should be pumped 20 minutes more. If the pressure can't achieve -0.1Mpa(14.5Psi) after pumping 50 minutes, please check if there are some leakage points. Fully close the handle Lo valve of the manifold valve and stop the operation of the vacuum pump. Confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
7) Turn the flare nut of the 3-way valves about 45° counterclockwise for 6 or 7seconds after the gas coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure. Then remove the charge hose from the 3 way valve.
8) Fully open the 2 way valve and 3 way valve and securely tighten the cap of the 3 way valve.

2. Air purging by refrigerant



Procedure:

1). Confirm that both the 2-way and 3-way valves are set to the closed position.

2). Connect the charge set and a charging cylinder to the service port of the 3-way valve.

3). Air purging.

Open the valves on the charging cylinder and the charge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45' for 3 seconds then closing it for 1 minute; repeat 3 times.

After purging the air, use a torque wrench to tighten the flare nut on the 2-way valve.

4). Check the gas leakage.

Check the flare connections for gas leakage.

5). Discharge the refrigerant.

Close the valve on the charging cylinder and discharge the refrigerant by loosening the flare nut on the 2-way valve approximately 45’ until the gauge indicates 0.3Mpa(43.5Psi) to 0.5 Mpa(72.5Psi).

6). Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position.

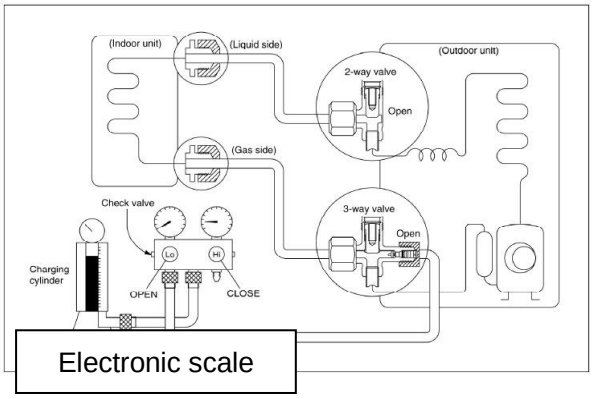
Be sure to use a hexagonal wrench to operate the valve stems.

7). Mount the valve stems nuts and the service port cap.

Be sure to use a torque wrench to tighten the service port cap to a torque 18N·m.

Be sure to check the gas leakage.

3. Adding refrigerant if the pipe length >7.5m(0.3in)



Electronic scale

Procedure:

1). Connect the charge hose to the charging cylinder, open the 2-way valve and the 3-way valve.

Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure the liquid charge.

2). Purge the air from the charge hose.

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

3) Put the charging cylinder onto the electronic scale and record the weight.

4) Operate the air conditioner at the cooling mode.

5) Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.

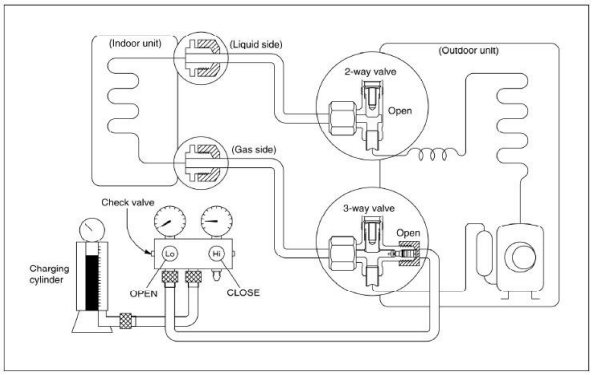
6).When the electronic scale displays the proper weight (refer to the table), disconnect the charge hose from the 3-way valve’s service port immediately and turn off the air conditioner

7). Mount the valve stems nuts and the service port cap.

Be sure to use a torque wrench to tighten the service port cap to a torque 18N·m.

Be sure to check the gas leakage.

7.5 Adding the refrigerant after running the system for many years



Procedure

1). Connect the charge hose to the 3-way service port, open the 2-way valve and the 3-way valve.

Connect the charge hose to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.

2). Purge the air from the charge hose.

Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).

3) Put the charging cylinder onto the electronic scale and record the weight.

4) Operate the air conditioner at the cooling mode.

5) Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.

6).When the electronic scale displays the proper weight (refer to the gauge and the pressure of the low side), disconnect the charge hose from the 3-way valve's service port immediately and turn off the air conditioner before disconnecting the hose.

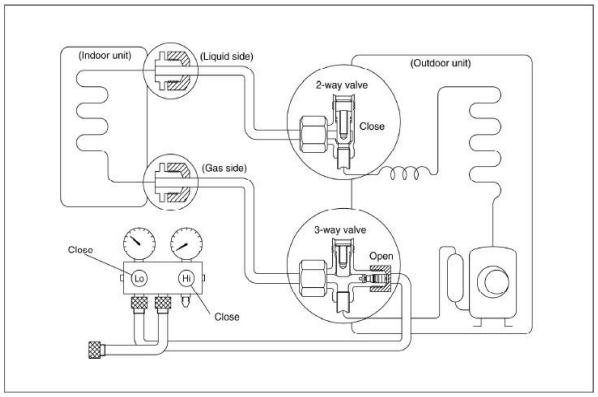
7). Mount the valve stem caps and the service port

Use torque wrench to tighten the service port cap to a torque of 18N.m.

Be sure to check for gas leakage.

7.6 Re-installation while the indoor unit need to be repaired

1. Collecting the refrigerant into the outdoor unit



Procedure

1). Confirm that both the 2-way and 3-way valves are set to the opened position

Remove the valve stem caps and confirm that the valve stems are in the opened position.

Be sure to use a hexagonal wrench to operate the valve stems.

2). Connect the charge hose with the push pin of handle lo to the 3-way valves gas service port.

3). Air purging of the charge hose.

Open the handle Lo valve of the manifold valve slightly to purge air from the charge hose for 5 seconds and then close it quickly.

4). Set the 2-way valve to the close position.

5). Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1Mpa(14.5Psi).

6). Set the 3-way valve to the closed position immediately

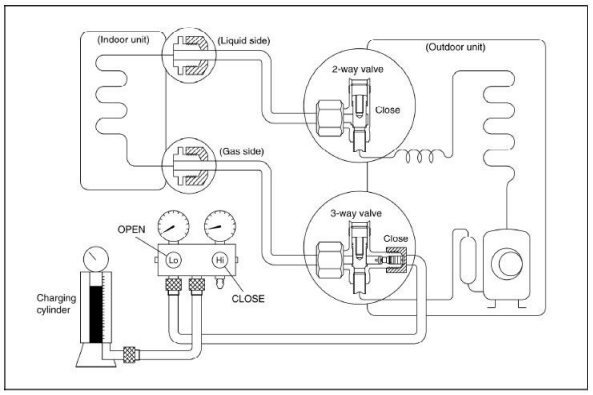
Do this quickly so that the gauge ends up indicating 0.3Mpa(43.5Psi) to 0.5 Mpa(72.5Psi).

Disconnect the charge set, and tighten the 2-way and 3-way valve's stem nuts.

Use a torque wrench to tighten the 3-way valves service port cap to a torque of 18N.m.

Be sure to check for gas leakage.

2. Air purging by the refrigerant



Procedure:

1). Confirm that both the 2-way and 3-way valves are set to the closed position.

2). Connect the charge set and a charging cylinder to the service port of the 3-way valve

Leave the valve on the charging cylinder closed.

3). Air purging.

Open the valves on the charging cylinder and the charge set. Purge the air by loosening the flare nut on the 2-way valve approximately 45' for 3 seconds then closing it for 1 minute; repeat 3 times.

After purging the air, use a torque wrench to tighten the flare nut on the 2-way valve.

4). Check the gas leakage

Check the flare connections for gas leakage.

5). Discharge the refrigerant.

Close the valve on the charging cylinder and discharge the refrigerant by loosening the flare nut on the 2-way valve approximately 45' until the gauge indicates 0.3Mpa(43.5Psi) to 0.5 Mpa(72.5Psi).

6). Disconnect the charge set and the charging cylinder, and set the 2-way and 3-way valves to the open position

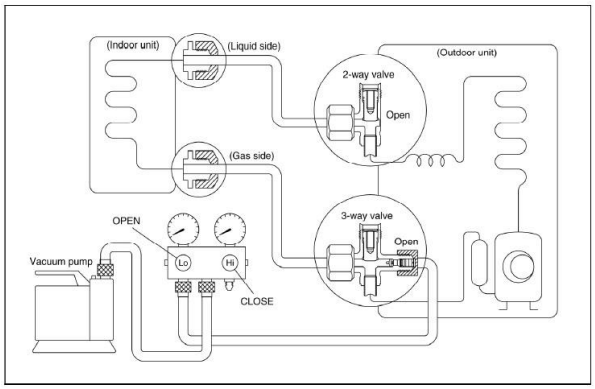
Be sure to use a hexagonal wrench to operate the valve stems.

7). Mount the valve stems nuts and the service

port cap
Be sure to use a torque wrench to tighten the service port cap to a torque 18N.m.
Be sure to check the gas leakage.

7.7 Re-installation while the outdoor unit need to be repaired

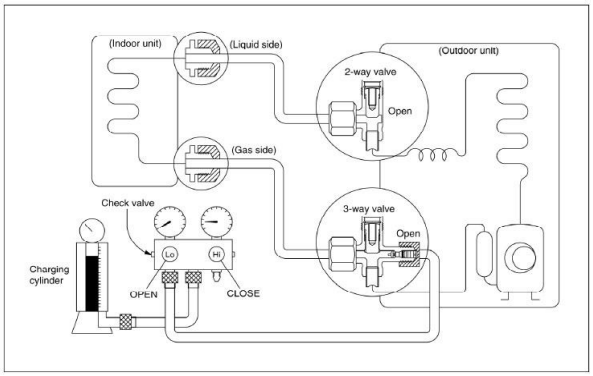
1. Evacuation for the whole system



Procedure:

1). Confirm that both the 2-way and 3-way valves are set to the opened position.
2). Connect the vacuum pump to 3-way valve's service port.
3). Evacuation for approximately one hour. Confirm that the compound meter indicates -0.1Mpa(14.5Psi).
4). Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
5). Disconnect the charge hose from the vacuum pump.

2. Refrigerant charging



Procedure:

1). Connect the charge hose to the charging cylinder, open the 2-way valve and the 3-way valve
Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.
2). Purge the air from the charge hose
Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).
3) Put the charging cylinder onto the electronic scale and record the weight.
4). Open the valves (Low side) on the charge set and charge the system with liquid refrigerant
If the system cannot be charge with the specified amount of refrigerant, or can be charged with a little at a time (approximately 150g each time) , operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure.
5).When the electronic scale displays the proper weight, disconnect the charge hose from the 3-way valve's service port immediately
If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.
6). Mounted the valve stem caps and the service port. Use torque wrench to tighten the service port cap to a torque of 18N.m. Be sure to check for gas leakage.

8. Operation Characteristics

<table>
<tr><th>Temperature
Mode</th><th>Cooling operation</th><th>Heating operation</th><th>Drying operation</th></tr>
<tr><td>Room temperature</td><td>≥17℃
(62℉)</td><td>≤30℃
(86℉)</td><td>> 10℃
(50℉)</td></tr>
<tr><td rowspan="2">Outdoor temperature</td><td>0℃ ~ 50℃
(32℉ ~ 122℉)</td><td rowspan="2">-15℃ ~ 30℃
(5℉ ~ 86℉)</td><td rowspan="2">0℃ ~ 50℃
(32℉ ~ 122℉)</td></tr>
<tr><td>-15℃ ~ 50℃
(5℉ ~ 122℉)
(For the models with
low temperature cooling system)</td></tr>
</table>

CAUTION:

1. If the air conditioner is used beyond the above conditions, certain safety protection features may come into operation and cause the unit to operate abnormally.

2. The room relative humidity should be less than 80%. If the air conditioner operates beyond this figure, the surface of the air conditioner may attract condensation. Please set the vertical air flow louver to its maximum angle (vertically to the floor), and set HIGH fan mode.

3. The optimum performance will be achieved during this operating temperature zone.

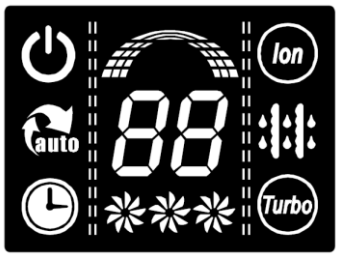
9. Electronic Function

9.1 Abbreviation

T1: Indoor room temperature
T2: Coil temperature of evaporator
T3: Coil temperature of condenser
T4: Outdoor ambient temperature
T5: Compressor discharge temperature

9.2 Display function

9.2.1 Icon explanation on indoor display board.



	**OPERATION indication lamp:** This lamp illuminates when the air conditioner is in operation.
	**AUTO indication lamp:** Lights up during the Auto operation.
	**TIMER indication lamp:** Lights up during Timer operation.
	**CLEAN AIR indication lamp:** Lights up when CLEAN AIR feature is activated.
	**DEFROST indication lamp(Only for heat pump models):** Lights up when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating operation.
	**TURBO indication lamp:** Lights up when select TURBO function on cooling operation or on heating operation.

	**DIGITAL DISPLAY** Display the current setting temperature or malfunction code when the air conditioner is in operation. When SELF CLEAN function is activated, it will display “SC”
	**FAN SPEED display** Display the selected fan speed: LOW(), MED( ) and HIGH(  ).
	**Operation Frequency display** This display is separated into five zones. The zones illuminate based on the compressor current frequency. For example, higher frequency will illuminate more zones.

9.3 Main Protection

9.3.1 Three Minutes Delay at restart for compressor

1 minute delay for the 1st time stand-up and 3 minutes delay for others.

9.3.2 Temperature protection of compressor top

The unit will stop working when the compressor top temp. protector cut off, and will restart after the compressor top temp. protector restart.

9.3.3 Temperature protection of compressor discharge

When the compressor discharge temp. is getting higher, the running frequency will be limited as below rules:

---Compressor discharge temp. T5>115℃ for 5s, compressor stops.

---108<T5<115℃, decrease the frequency to the lower level every 3 minutes.

---90<T5<105℃, keep running at the current frequency.

----T5<90℃, no limit for frequency.

9.3.4 Fan Speed is out of control

When Indoor Fan Speed keeps too low (300RPM) for certain time, the unit will stop and the LED will display the failure

9.3.5 Inverter module Protection

The Inverter module has a protection function about current, voltage and temperature. If these protections happen, the corresponding code will display on indoor unit and the unit will stop working.

9.3.6 Indoor fan delayed open function

When the unit starts up, the louver will be active immediately and the indoor fan will open 10s later.

If the unit runs in heating mode, the indoor fan will be also controlled by anti-cold wind function.

9.3.7 Compressor preheating functions

Preheating permitting condition:

If T4(outdoor ambient temperature)＜3℃ and the machine connects to power supply newly or if T4＜3℃ and compressor has stopped for over 3 hours, the compressor heating cable will work.

Preheating mode:

A weak current flow through the coil of compressor from the wiring terminal of the compressor, then the compressor is heated without operation.

Preheating release condition:

If T4＞5℃ or the compressor starts running, the preheating function will stop.

9.3.8 Zero crossing detection error protection

If AC detects time interval is not correct for continuous 240s, the unit will stop and the LED will display the failure. The correct zero crossing signal time interval should be between 6-13ms.

9.4.2.9 Condenser temperature protection

---55℃<T3<60℃, the compressor frequency will decrease to the lower level until to F1 and then runs at F1.If T3<54℃, the compressor will keep running at the current frequency.

---T3<52℃, the compressor will not limit the frequency and resume to the former frequency.

---T3>60℃ for 5 seconds, the compressor will stop until T3<52℃.

9.4.2.10 Evaporator temperature protection

---T2<0℃, the compressor will stop and restart when T2>=5℃.

---0℃≦T2<4℃, the compressor frequency will be limited and decreased to the lower level

---4℃≤T2≤7℃, the compressor will keep the current frequency.

---T2>7℃, the compressor frequency will not be limited.

9.4 Operation Modes and Functions

9.4.1 Fan mode

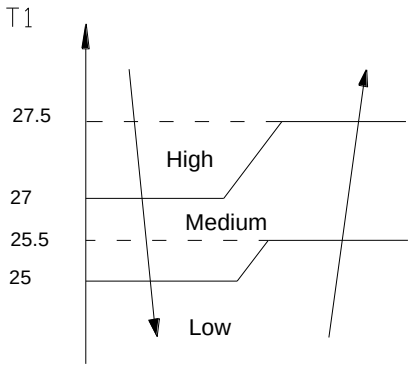
(1) Outdoor fan and compressor stop.

(2) Temperature setting function is disabled, and no setting temperature is displayed.

(3) Indoor fan can be set to high/med/low/auto.

(4) The louver operates same as in cooling mode.

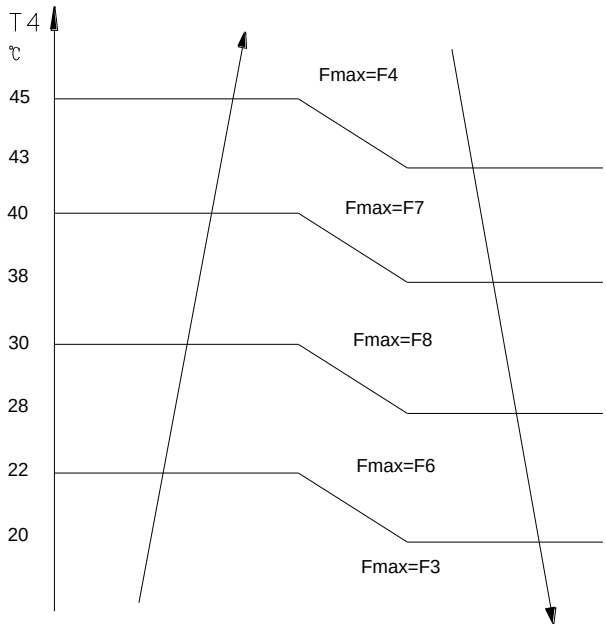
(5) Auto fan:



9.4.2 Cooling Mode

9.4.2.1 Compressor running rules

The maximum operation frequency of compressor after starting submits to following rule.



Fmax: The maximum operation frequency of until to F1.

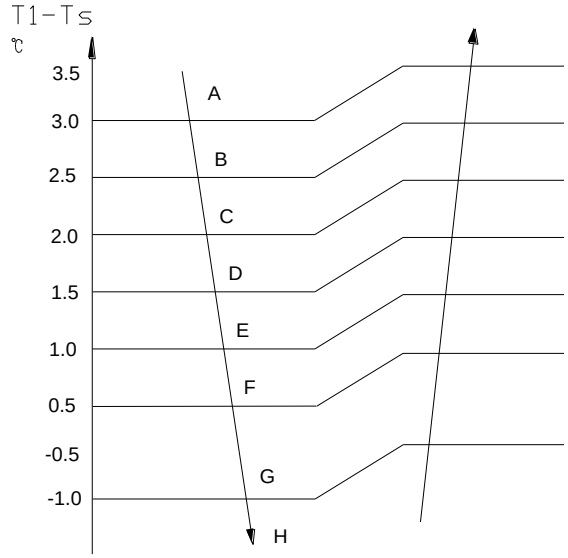
H: Run at F1 for 1h.(if T1-Ts<-2℃, the compressor will stop)

Meanwhile, the compressor running frequency is limited by the current.

compressor.

F1~F8: The detailed value of the compressor operation frequency.

If users switch on AC by remote controller, the compressor will run at the Fmax frequency for 7 minutes according to the outdoor ambient temp. During the 7 minutes, the frequency limitation is active. 7 minutes later, the compressor running frequency will be controlled as below:



While the zones of A,B,C... are corresponding to different compressor running frequency.

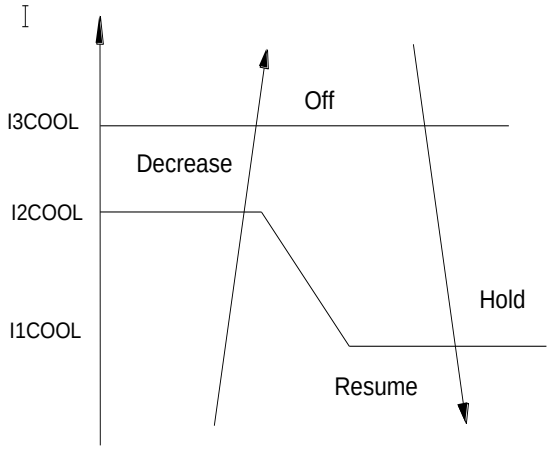
Note:

When T1-Ts keeps in the same temp. zone for 3 minutes, the compressor will run as the below rules:

A~E: Increase the frequency to the higher level until to F8.

F: Keep the current frequency.

G: Decrease the frequency to the lower level



I3COOL, I2COOL,I1COOL mean different running current value.

Off: Compressor stops.

Decrease: Decrease the running frequency to the lower level.

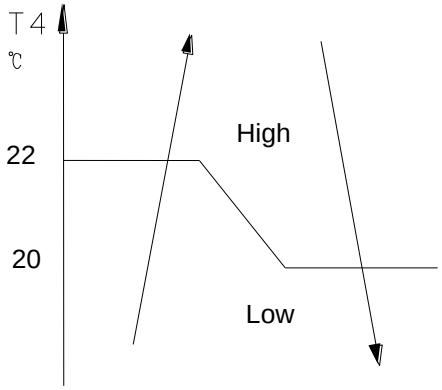
Hold: Keep the current frequency.

Resume: No limitation for frequency.

Note:

When AC is in “hold” zone for 3 minutes, the compressor frequency will rise to the higher level.(frequency will increase twice at most)

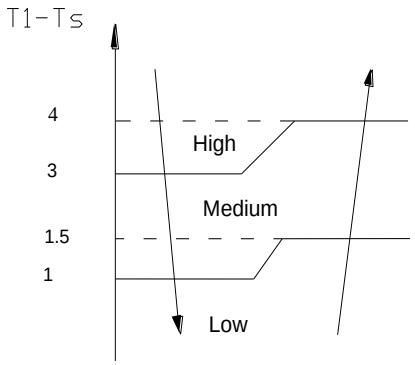
9.4.2.2 Outdoor fan running rules



9.4.2.3 Indoor fan running rules

In cooling mode, indoor fan runs all the time and the speed can be selected as high, medium, low and auto.

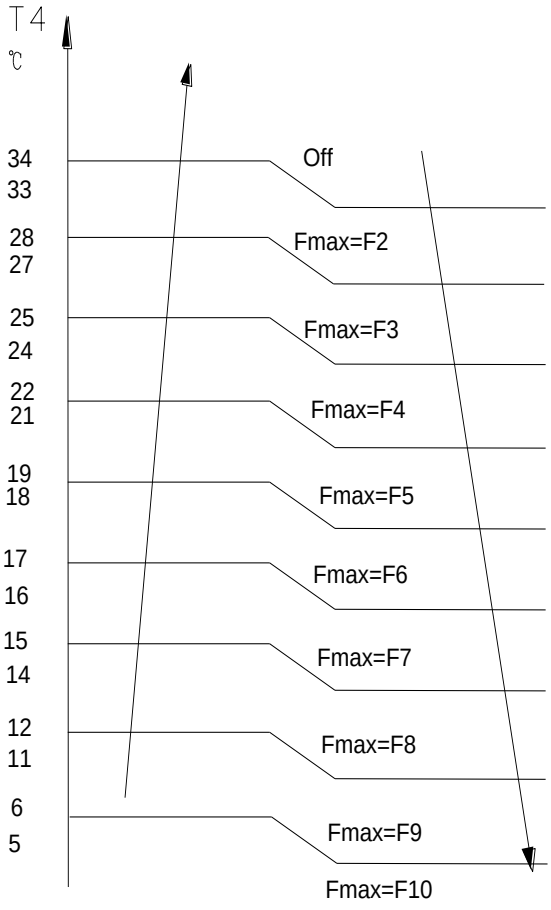
Auto fan in cooling mode acts as follow:



9.4.3 Heating Mode

9.4.3.1 Compressor running rules

The maximum operation frequency of the compressor after starting submits to the following rule.



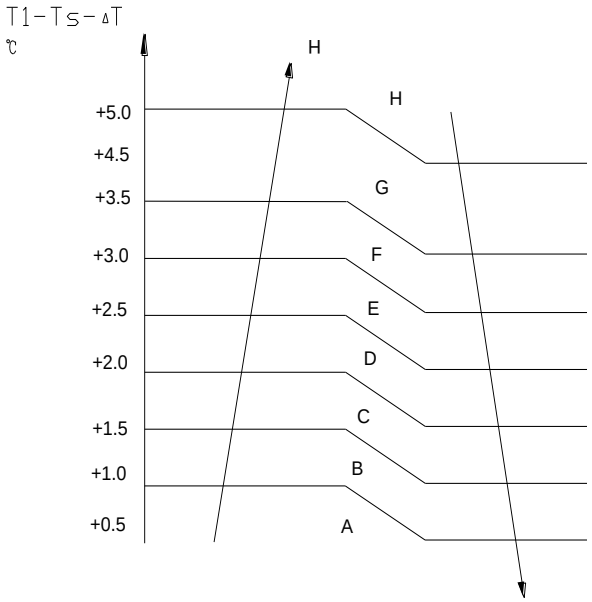
Fmax: The maximum operation frequency of compressor.

F1~F8: The detailed value of the compressor operation frequency.

If users switch on AC by remote controller, the compressor will run at the Fmax frequency for 7 minutes according to outdoor ambient temp.

During the 7 minutes, the frequency limitation is active.

7 minutes later, the compressor running frequency will be controlled as below:



While the zones of A,B,C... are corresponding to different compressor running frequency.

ΔT=0℃ as default.

Note:

When T1-Ts keeps in the same temp. zone for 3 minutes, the compressor will run as the below rules:

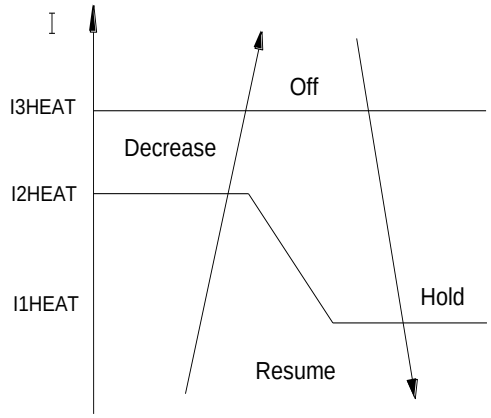
A~E: Increase the frequency to the higher level until to F10.

F: Keep the current frequency.

G: Decrease the frequency to the lower level until to F1.

H: Run at F1 for 1h.(if T1-Ts-ΔT >6℃, the compressor will stop)

Meanwhile, the compressor running frequency is limited by the current.



I3HEAT, I2HEAT,I1HEAT mean different running current value.

Off: Compressor stops.

Decrease: Decrease the running frequency to the lower level.

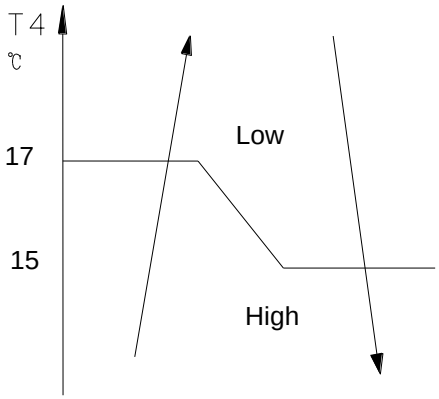
Hold: Keep the current frequency.

Resume: No limitation for frequency.

Note:

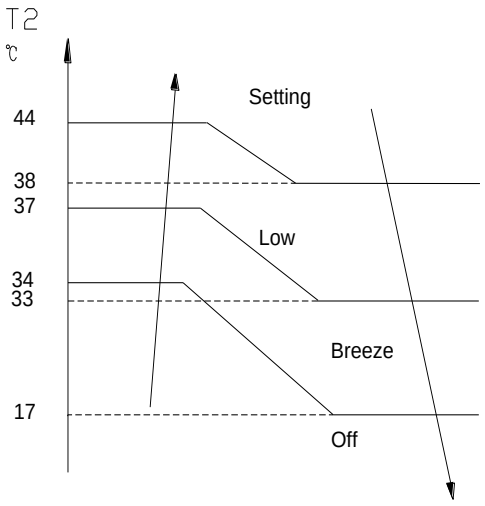
When AC is in “hold” zone for 3 minutes, the compressor frequency will rise to the higher level. (The frequency will increase twice at most)

9.4.3.2 Outdoor fan running rules

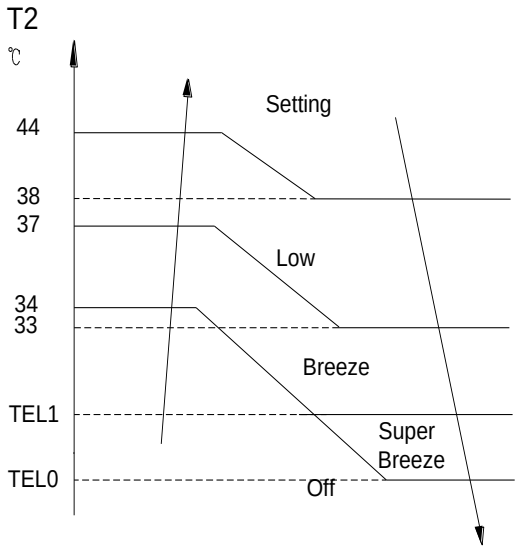


9.4.3.3 Indoor fan running rules

For 18k,24k models:



For 9k,12k models:



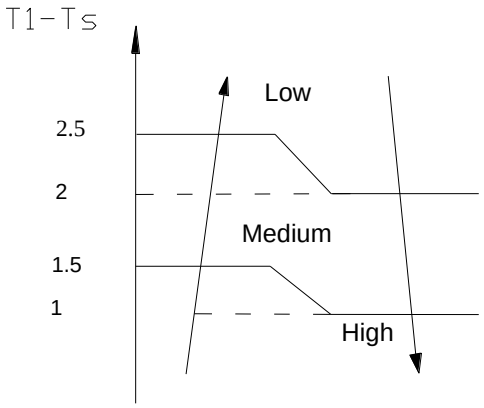
TEL1=24,TEL0=17.

If the compressor stops caused by the room temperature rising, the indoor fan will be forced to run 127 seconds with breeze. During this period, the anti-cold-wind is disabled.

If the machine runs in rating capacity test mode, the indoor fan will run with rating speed and the anti-cold-wind function is disabled.

Indoor fan speed can be set as high, medium, low or auto fan and the anti-cold-wind function is preferential.

Auto fan action in heating mode:



9.4.3.4 Defrosting mode

Condition of defrosting:

----T4＞0℃,

When the units are running, if the following two items are satisfied, the units start defrosting:

The units run with T3＜3℃ for 40 minutes and T3 keeps lower than TCDI℃ for more than 3 minutes.

The units run with T3＜3℃ for 80 minutes and T3 keeps lower than TCDI+2℃ for more than 3 minutes.

----T4＜0℃,

If the 1st condition and 2nd condition items are satisfied, then the program judges if T2 has decreased more than 5 ℃.When T2 has decreased more than 5℃, enter the defrosting mode.

----No matter what value T4 is, if the machine runs with T3＜3℃ for more than 120 minutes and T3 keeps lower than TCDI+4℃ for more than 3 minutes, the machine will enter defrosting mode no matter if T2 drops more than 5℃ or not.

Condition of ending defrosting:

If any one of the following items is satisfied, the defrosting will finish and the machine will turn to normal heating mode.

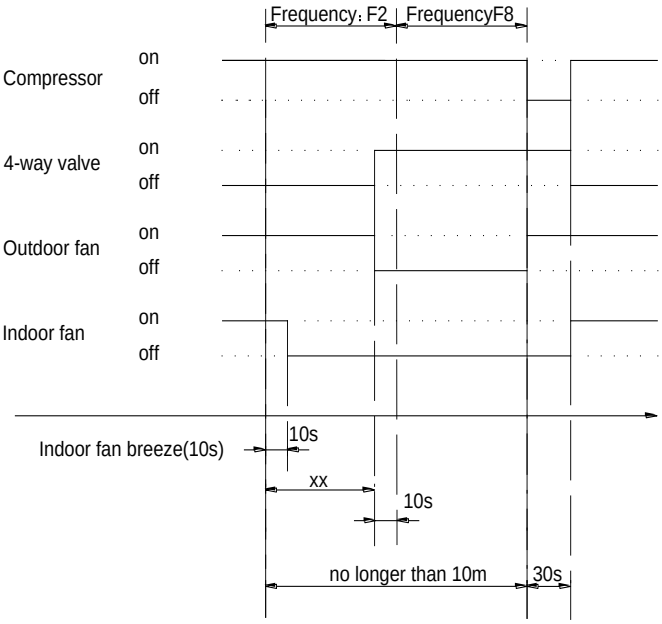
----T3 rises to be higher than TCDE1℃.

----T3 keeps to be higher than TCDE2℃ for 80 seconds.

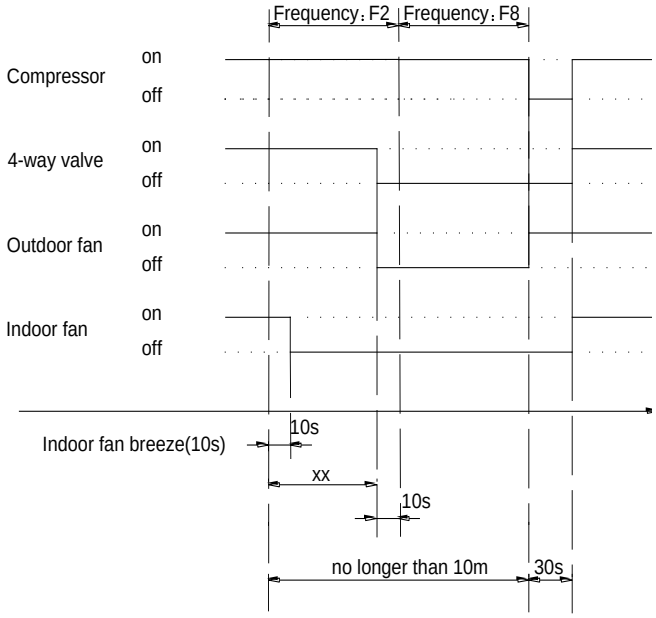
----The machine has run for 10 minutes in defrosting mode.

Defrosting action：

For 9k and 12k models:


Frequency: F2
FrequencyF8
Compressor
on
off
4-way valve
on
off
Outdoor fan
on
off
Indoor fan
on
off
Indoor fan breeze(10s)
10s
xx
10s
no longer than 10m
30s

For 18k and 24k models:



XX=90.

9.4.3.5 Evaporator coil temperature protection

----T2> TEH2 ℃, the compressor running frequency decreases to the lower level and runs for 20s.

When the frequency decreases to F2 and the T2 is still over TEH2℃ for 3 minutes, the compressor will stop.

----T2<48℃ or T2 stays in 48℃~ TEH2℃ for 6 minutes, the frequency will not be limited by T2.

----T2>60 ℃, the compressor will stop and restart when T2<48℃.

9.4.4 Auto-mode

This mode can be chosen with remote controller and the setting temperature can be changed between 17~30℃.

In auto mode, the machine will choose cooling, heating or fan-only mode according to ΔT (ΔT =T1-Ts).

ΔT=T1-Ts	Running mode
ΔT＞1℃	Cooling
-1<ΔT≤1℃	Fan-only
ΔT≤-1℃	Heating

Indoor fan will run at auto fan of the relevant mode.

The louver operates same as in relevant mode.

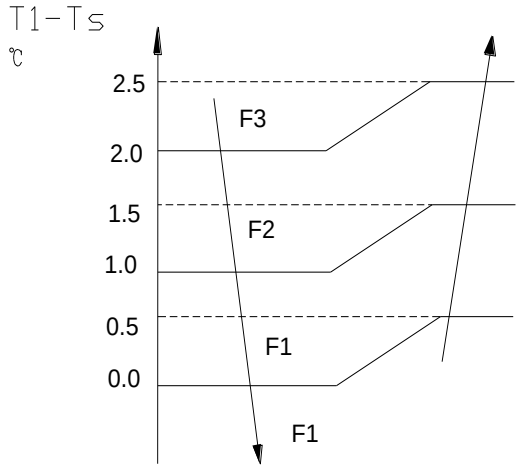
If the machine switches mode between heating and cooling, the compressor will keep stopping for 15 minutes and then choose mode according to T1-Ts.

If the setting temperature is modified, the machine will choose running function again.

9.4.5 Drying mode

9.4.5.1 Indoor fan speed is fixed at breeze and can't be changed. The louver angle is the same as in cooling mode.

9.4.5.2 Compressor running rules



9.4.5.3 Low indoor room temperature protection

In drying mode, if room temperature is lower than 10℃, the compressor will stop and not resume until room temperature exceeds 12℃.

9.4.5.4 Evaporator anti-freezing protection, condenser high temperature protection and outdoor unit frequency limit are active and the same as that in cooling mode.

9.4.5.5 The outdoor fan operates the same as in cooling mode.

9.4.6 Forced operation function

9.4.6.1 Enter forced operation function:

When the machine is off, pressing the touch button will carry the machine to forced auto mode. If pressing the button once again within 5 seconds, the machine will turn into forced cooling mode.

In forced auto, forced cooling or any other operation mode, pressing touch button will turn off the machine.

9.4.6.2 In forced operation mode, all general

protections and remote control are available.
9.4.6.3 Operation rules:
Forced cooling mode:
The compressor runs at F2 frequency and indoor fan runs as breeze. After running for 30 minutes. the machine will turn to auto mode as 24℃ setting temperature.
Forced auto mode:
The action of forced auto mode is the same as normal auto mode with 24 ℃ setting temperature.

9.4.7 Timer function

9.4.7.1 Timing range is 24 hours.
9.4.7.2 Timer on. The machine will turn on automatically when reaching the setting time.
9.4.7.3 Timer off. The machine will turn off automatically when reaching the setting time.
9.4.7.4 Timer on/off. The machine will turn on automatically when reaching the setting “on” time, and then turn off automatically when reaching the setting “off” time.
9.4.7.5 Timer off/on. The machine will turn off automatically when reaching the setting “off” time, and then turn on automatically when reaching the setting “on” time.
9.4.7.6 The timer function will not change the AC current operation mode. Suppose AC is off now, it will not start up firstly after setting the “timer off” function. And when reaching the setting time, the timer LED will be off and the AC running mode has not been changed.
9.4.7.7 The setting time is relative time.

9.4.8 Sleep function mode

9.4.8.1 Operation time in sleep mode is 7 hours. After 7 hours the AC quits this mode and turns off.
9.4.8.2. Operation process in sleep mode is as follow:
When cooling, the setting temperature rises 1℃ (be lower than 30℃) every one hour, 2 hours later the setting temperature stops rising and indoor fan is fixed as low speed.
When heating, the setting temperature decreases 1℃ (be higher than 17℃) every one hour, 2 hours later the setting temperature stops rising and indoor fan is fixed as low speed. (Anti-cold wind function has the priority)
9.4.8.3 Timer setting is available
9.4.8.4 When user uses timer off function in sleep mode (or sleep function in timer off mode), if the timing is less than 7 hours, sleep function will be cancelled when reaching the setting time. If the timing is more than 7 hours, the machine will not stop until reaches the setting time in sleep mode.

9.4.9 Auto-Restart function

The indoor unit is equipped with auto-restart function, which is carried out through an auto-restart module. In case of a sudden power failure, the module memorizes the setting conditions before the power failure. The unit will resume the previous operation setting (not including swing function) automatically after 3 minutes when power returns.
If the memorization condition is forced cooling mode, the unit will run in cooling mode for 30 minutes and turn to auto mode as 24℃ setting temp.
If AC is off before power off and AC is required to start up now, the compressor will have 1 minute delay when power on. Other conditions, the compressor will have 3 minutes delay when restarts.

9.4.10 Automatic panel function

8.4.10.1 The automatic panel is forced to turn to the closing direction at an angle of 50°when the unit is getting through the power, and this action is not affected by any signal from remote controller.
9.4.10.2 When the unit is turned on, the panel is opened automatically at an angle of 50°, then the horizontal louver will be opened.
9.4.10.3 When the unit is turned off, the panel is closed automatically at an angle of 50°, then the horizontal louver will be closed.
9.4.10.4 If the panel needs moving when the horizontal louver is in action, the unit will stop the horizontal louver and then carry out the action of the panel. After ending the action of the panel, the horizontal louver will continue its action.

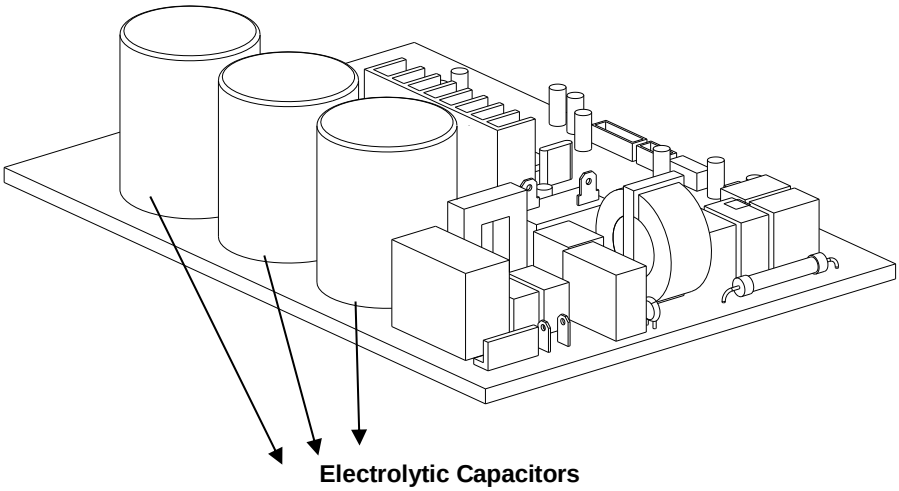
9.4.11 8℃ Heating(optional)

In heating operation, the preset temperature of the air conditioner can be as lower as 8℃, which keeps the room temperature steady at 8℃ and prevents household things freezing when the house is unoccupied for a long time in severe cold weather.

10. Troubleshooting

Safety

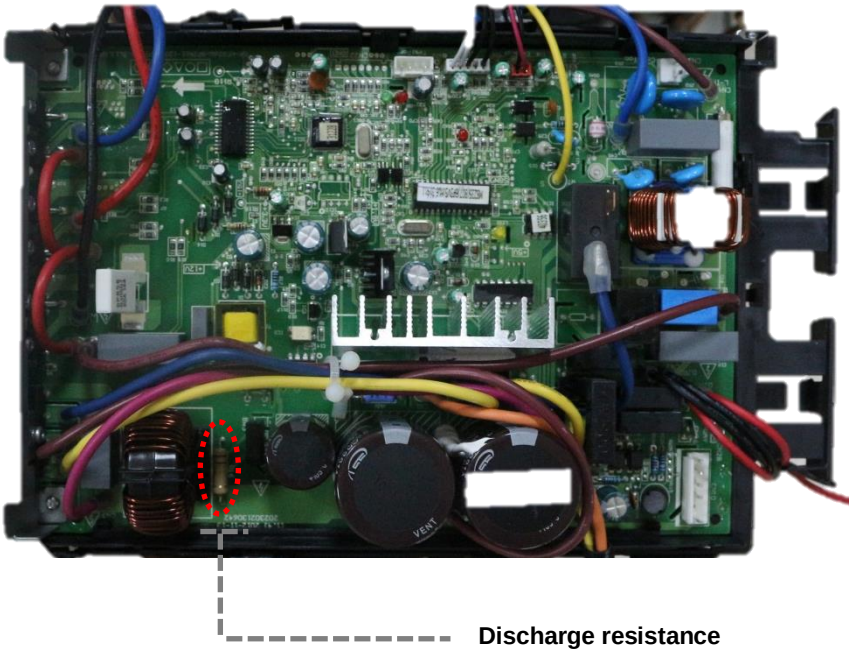
Electricity power is still kept in capacitors even the power supply is shut off. Do not forget to discharge the electricity power in capacitor.



Electrolytic Capacitors

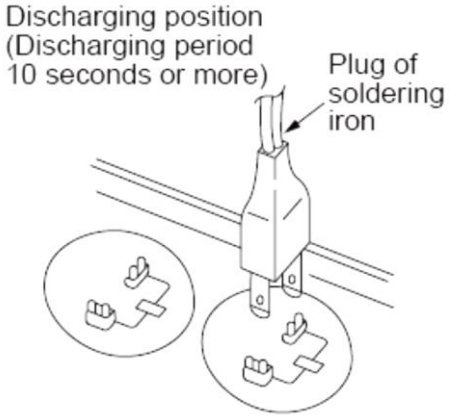
(HIGH VOLTAGE! CAUTION!)

For MSV1-09HRFN1-MT0W and MSV1-12HRFN1- MT0W models, there is a discharge resistance fixed on outdoor PCB board already. Just wait for 10 minutes and the electricity power in capacitor will be discharged over automatically.



Discharge resistance

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



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

10.1 Indoor Unit Error Display

Error code	Description
E0	Indoor unit EEPROM parameter error
E1	Indoor / outdoor units communication protection
E2	Zero-crossing signal error(except MSV1-09HRFN1-MT0W and MSV1-12HRFN1- MT0W models)
E3	Indoor unit fan speed has been out of control(only for MSV1-09HRFN1-MT0W, MSV1-12HRFN1- MT0W, MSV1-12HRDN1-MQ0W models)
E5	Open circuit or short circuit of outdoor unit temperature sensor/ outdoor unit EEPROM parameter error
E6	Open circuit or short circuit of room or evaporator temperature sensor
E7	Outdoor unit fan speed has been out of control(only for MSV1-09HRFN1-MT0W and MSV1-12HRFN1- MT0W models)
P0	IPM malfunction or IGBT over-strong current protection
P1	Over voltage or too low voltage protection
P2	Temperature protection of compressor top.
P3	Outdoor temperature is lower than -15°C(5℉) （optional function)
P4	Inverter compressor drive error

Note

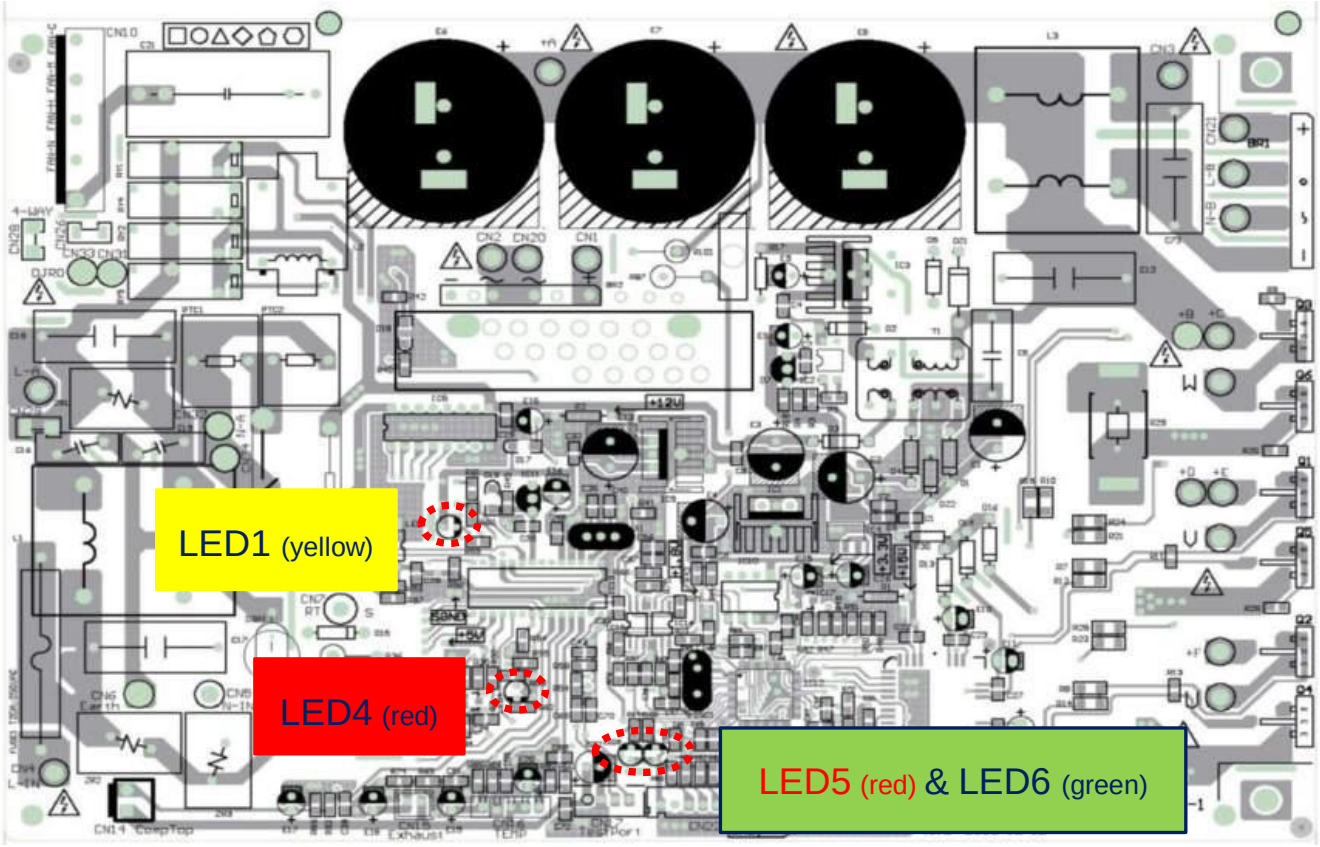
P3: If the outdoor temperature <= -15 °C(5℉) for 1 hour, then the machine stops running, the indoor display shows the error code "P3“. The unit can still receive remote control signals.

If the outdoor >= -12 °C(10℉) for 10 minutes, the compressor stops running more than one hour,

Or the outdoor temperature>= 5 ℃(41℉) for 10 minutes, then AC will recover to the last mode and fan speed.

E4 : Reserved function.

10.2 Outdoor unit error display



	standby	**operating**
LED1	slow flashing(0.2Hz)	on
LED4	on	on

The picture of PCB above is only for reference.

LED 4 is a red light and for the PCB POWER display.

LED 1 is a yellow light. After power on, it will be slow flash(0.2Hz) when the unit is in standby and quick flash (2.5Hz) if the unit has some problems.

LED 6(green) and LED5 (red) are two lights controlled by the compressor drive chip. Below are meanings for those lights.

No.	Problems	LED6 (Green)	LED5 (Red)	IU display
1	standby for normal	O	X	
2	Operation normally	X	O	
3	IPM malfunction or IGBT over-strong current protection	☆	X	P0
4	Over voltage or too low voltage protection	O	O	P1
5	Over voltage or too low voltage protection	O	☆	P1
6	Inverter compressor drive error	X	☆	P4
7	Inverter compressor drive error	☆	O	P4
8	Inverter compressor drive error	☆	☆	P4

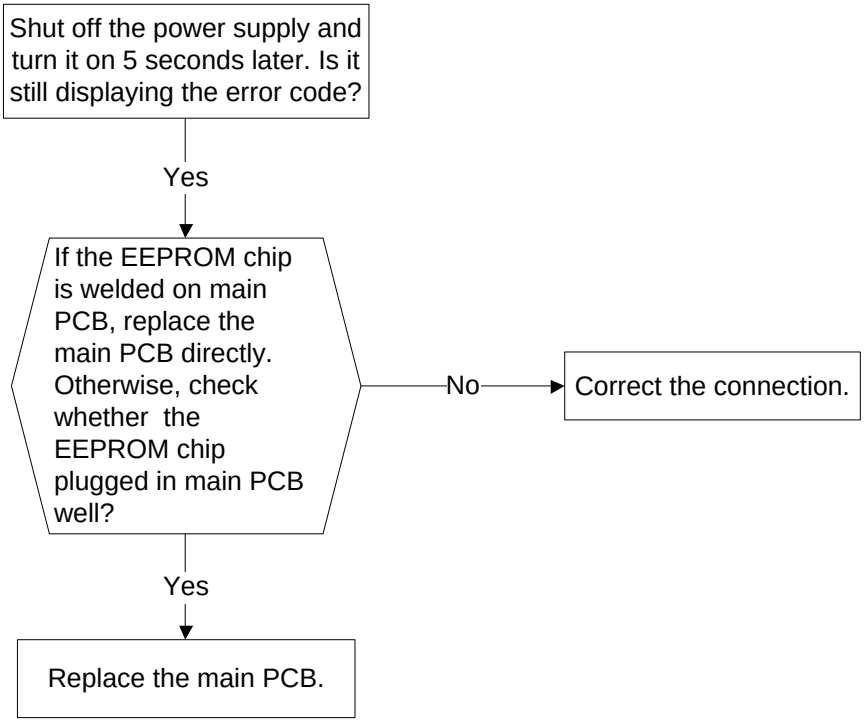
O（light） X（off） ☆（2.5Hz flash）

10.3 Diagnosis and Solution

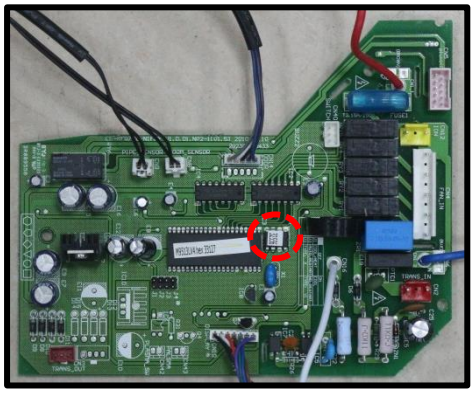
10.3.1 EEPROM parameter error diagnosis and solution(E0/E5)

Error Code	**E0/E5**
Malfunction decision conditions	**Indoor or outdoor PCB main chip does not receive feedback from EEPROM chip.**
Supposed causes	● **Installation mistake** ● **PCB faulty**

Trouble shooting:



EEPROM: a read-only memory whose contents can be erased and reprogrammed using a pulsed voltage. For the location of EEPROM chip, please refer to the below photos.



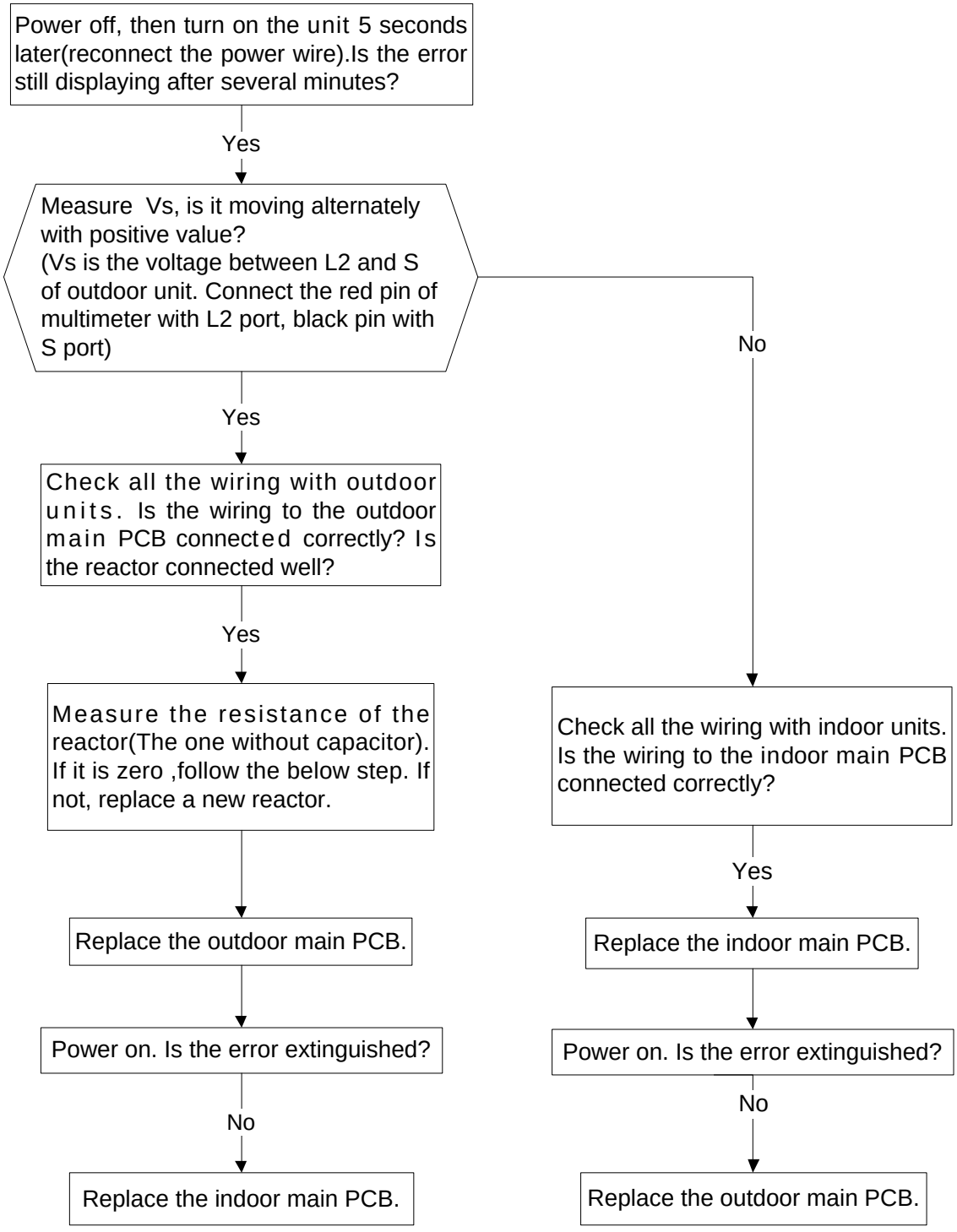
Indoor PCB

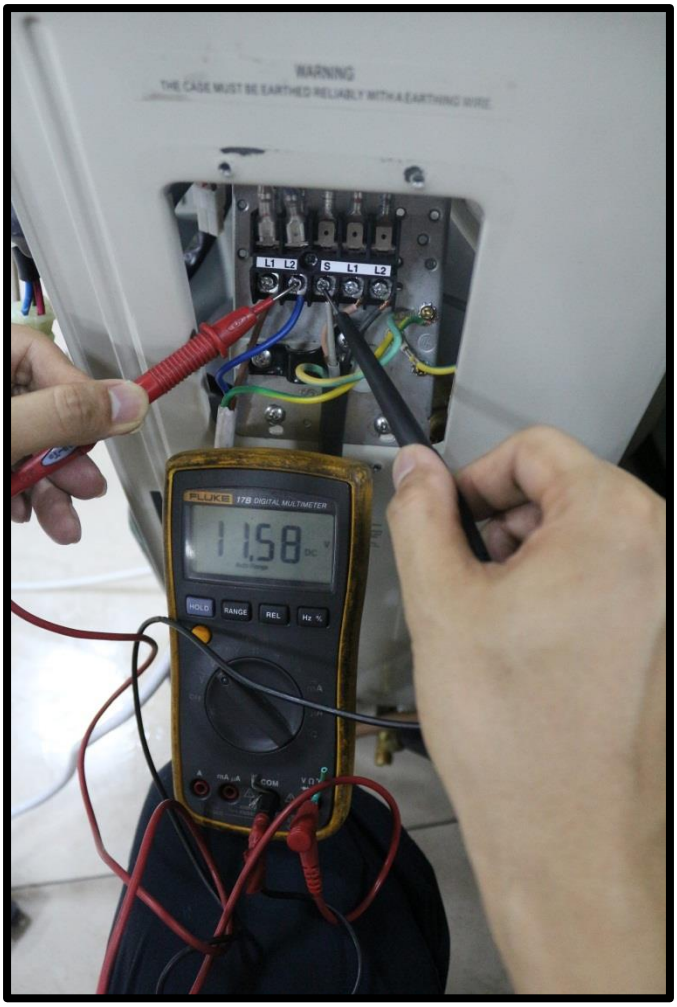
Outdoor PCB(MOC-12HFN1-MTOW)

10.3.2 Indoor / outdoor unit's communication diagnosis and solution(E1)

Error Code	E1
Malfunction decision conditions	Indoor unit does not receive the feedback from outdoor unit during 110 seconds and this condition happens four times continuously.
Supposed causes	• Wiring mistake • Indoor or outdoor PCB faulty

Trouble shooting:



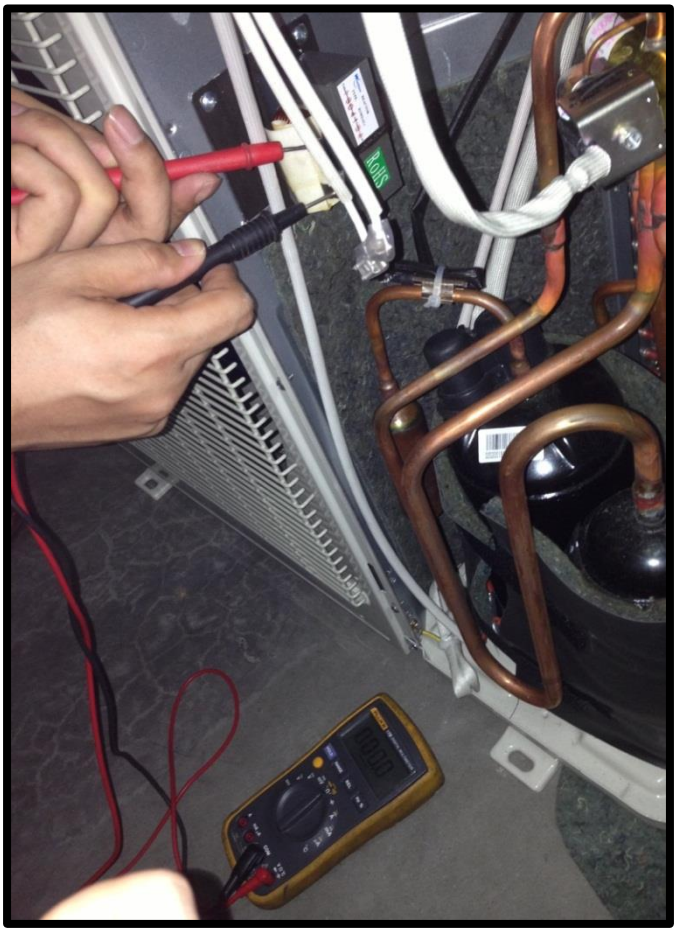


Remark:
Use a multimeter to test the DC voltage between L2 port and S port of outdoor unit. The red pin of multimeter connects with L2 port while the black pin is for S port.

When AC is normal running, the voltage will move alternately between -50V to 50V.

If the outdoor unit has malfunction, the voltage will move alternately with positive value.

While if the indoor unit has malfunction, the voltage will be a certain value.

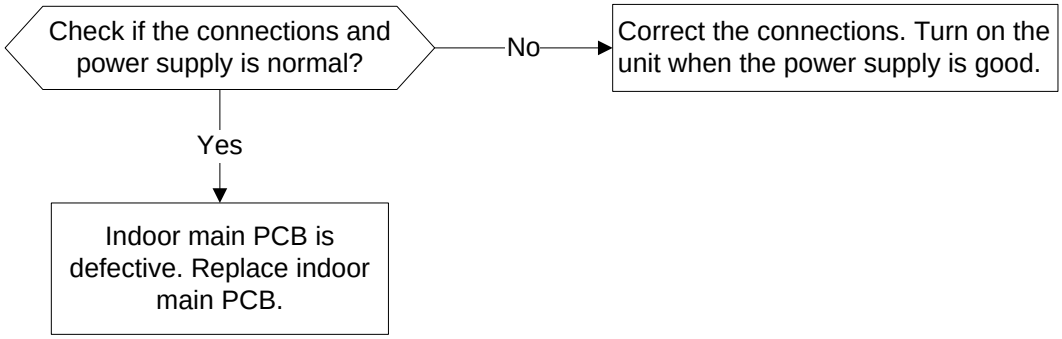


Remark:
Use a multimeter to test the resistance of the reactor which does not connect with capacitor.
The normal value should be around zero ohm. Otherwise, the reactor must have malfunction and need to be replaced.

10.4.3 Zero crossing detection error diagnosis and solution(E2)

Error Code	**E2**
Malfunction decision conditions	**When PCB does not receive zero crossing signal feedback for 4 minutes or the zero crossing signal time interval is abnormal.**
Supposed causes	● **Connection mistake** ● **PCB faulty**

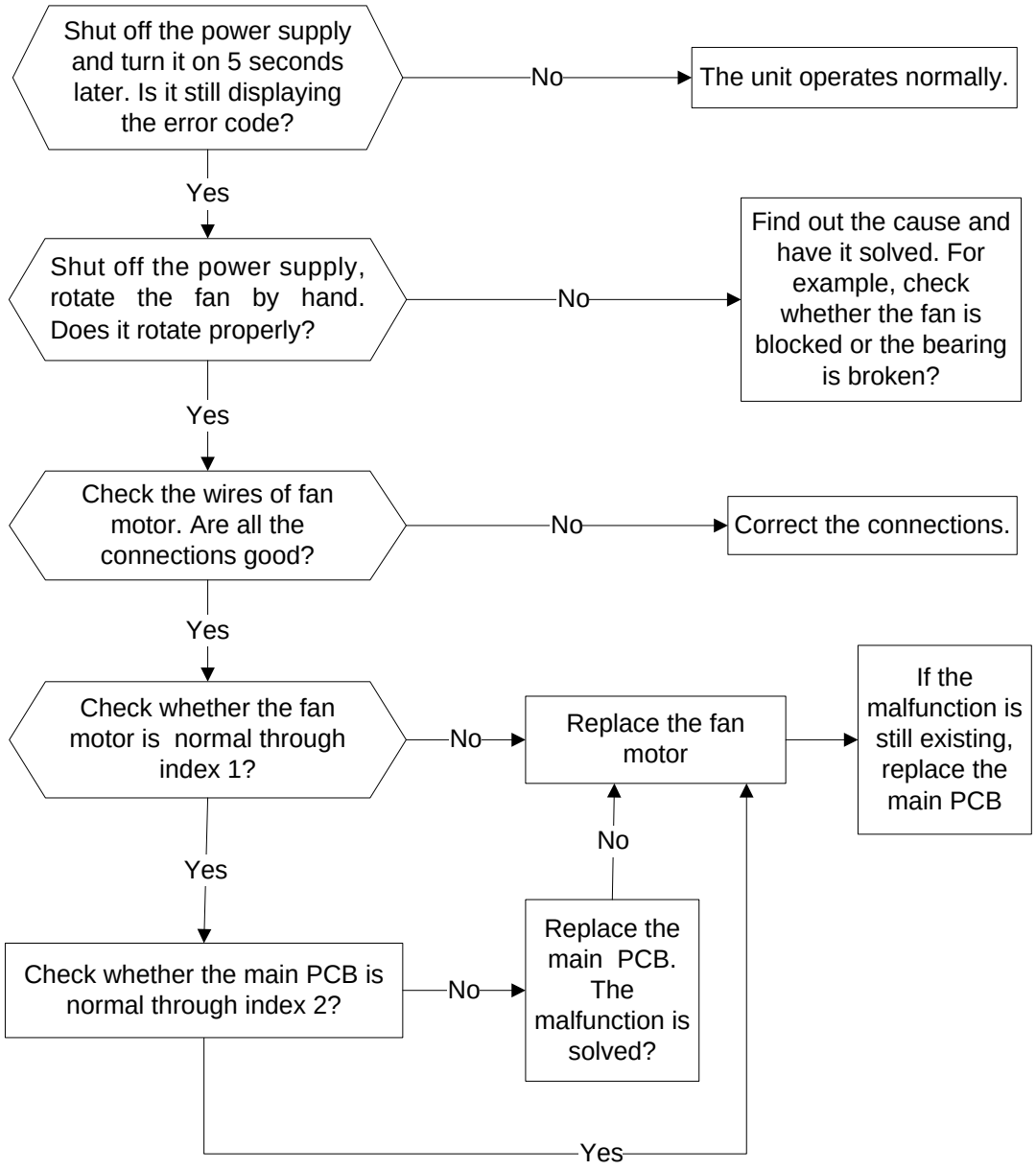
Trouble shooting:



10.4.4 Fan speed has been out of control diagnosis and solution(E3/E7)

Error Code	E3/E7
Malfunction decision conditions	When indoor or outdoor fan speed keeps too low (300RPM) for certain time, the unit will stop and the LED will display the failure.
Supposed causes	● Wiring mistake ● Fan ass'y faulty ● Fan motor faulty ● PCB faulty

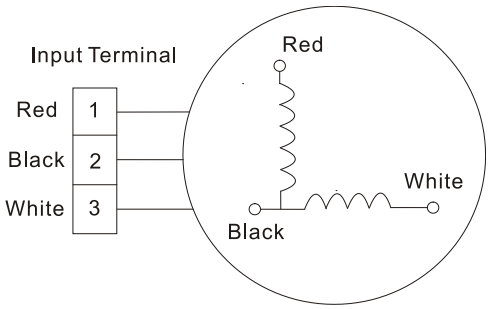
Trouble shooting:



Index 1:

1.Indoor AC fan motor

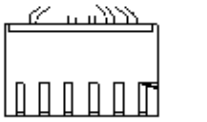
Measure the resistance value of each winding by using the tester.

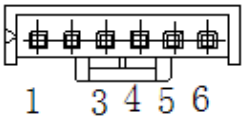


For the definite value of the resistance, refer to page61 and page64.

2.Indoor or outdoor DC fan motor(control chip is inside fan motor)

Measure the resistance value of each winding by using the tester. If any resistance value is zero, the fan motor must have problems and need to be replaced.



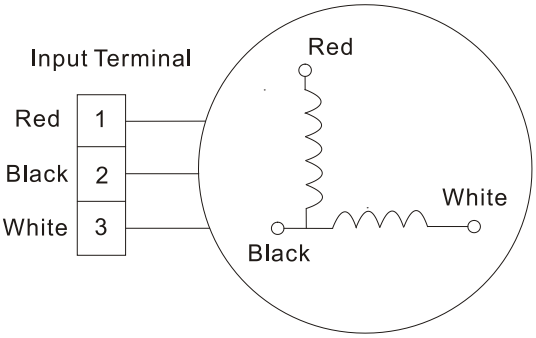


NO.	Color
1	Red
2	---
3	Black
4	White
5	Yellow
6	Blue

Index2:

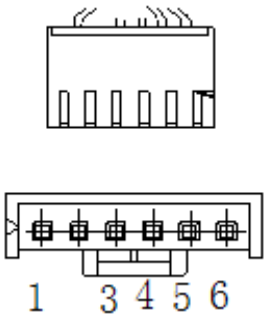
1: Indoor AC fan motor

Power on and set the unit running in fan mode at high fan speed. After running for 15 seconds, measure the voltage of pin1 and pin2. If the value of the voltage is less than 100V(208~240V power supply)or 50V(115V power supply), the PCB must have problems and need to be replaced.



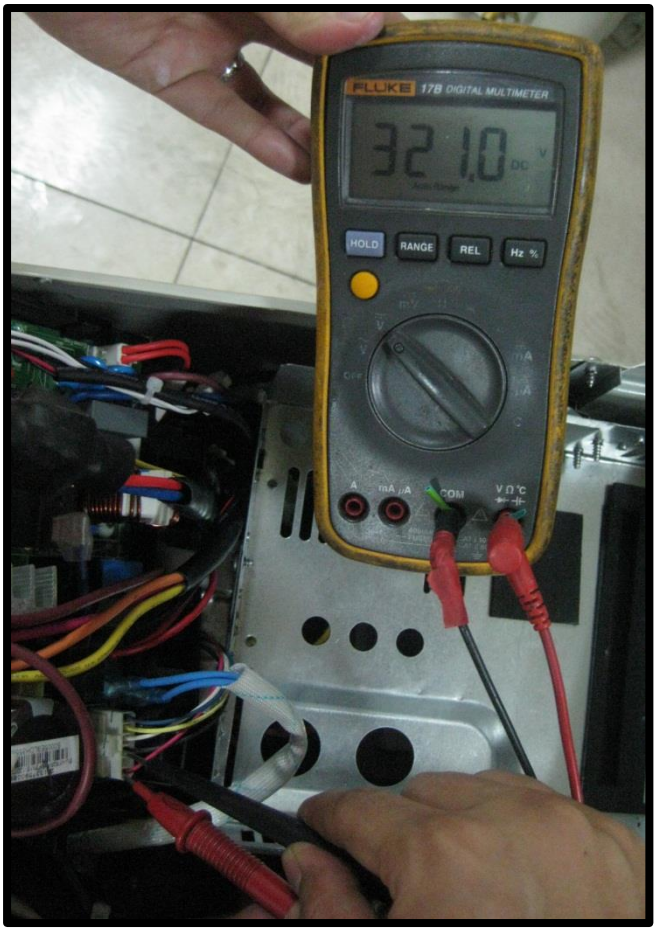
2. Indoor or outdoor DC fan motor(control chip is inside fan motor)

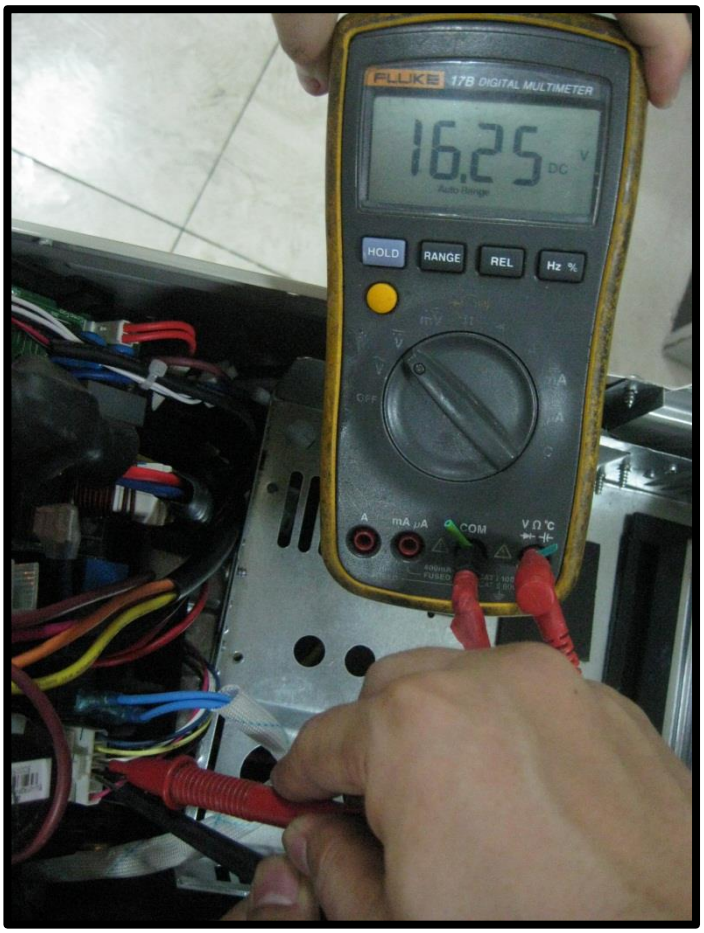
Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must have problems and need to be replaced.

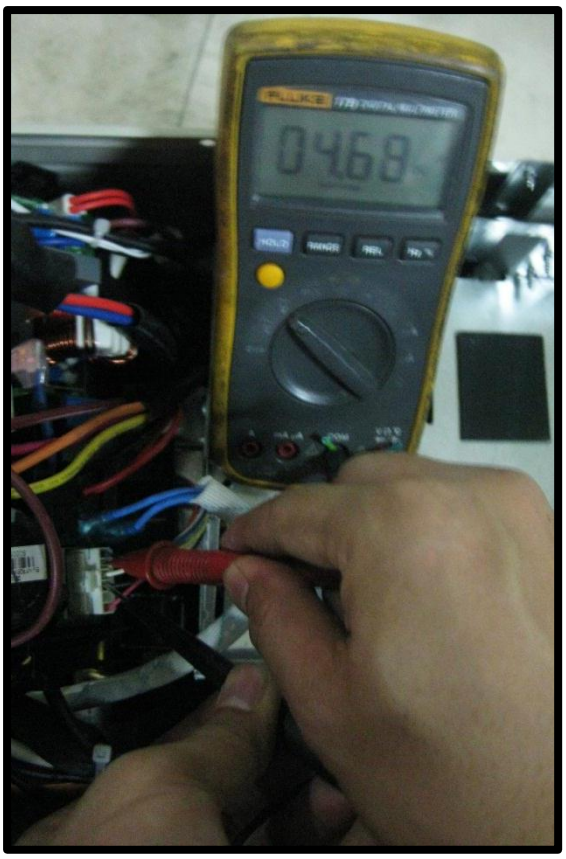


DC motor voltage input and output

NO.	Color	Signal	Voltage
1	Red	Vs/Vm	280V~380V
2	---	---	---
3	Black	GND	0V
4	White	Vcc	14-17.5V
5	Yellow	Vsp	0~5.6V
6	Blue	FG	0-17.5V





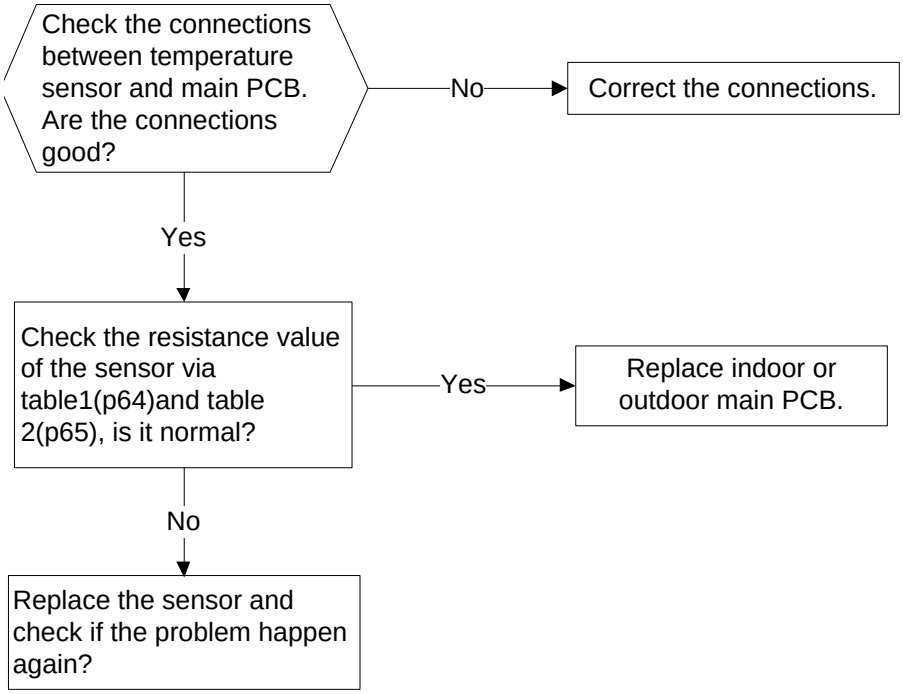

FLUKE
0468

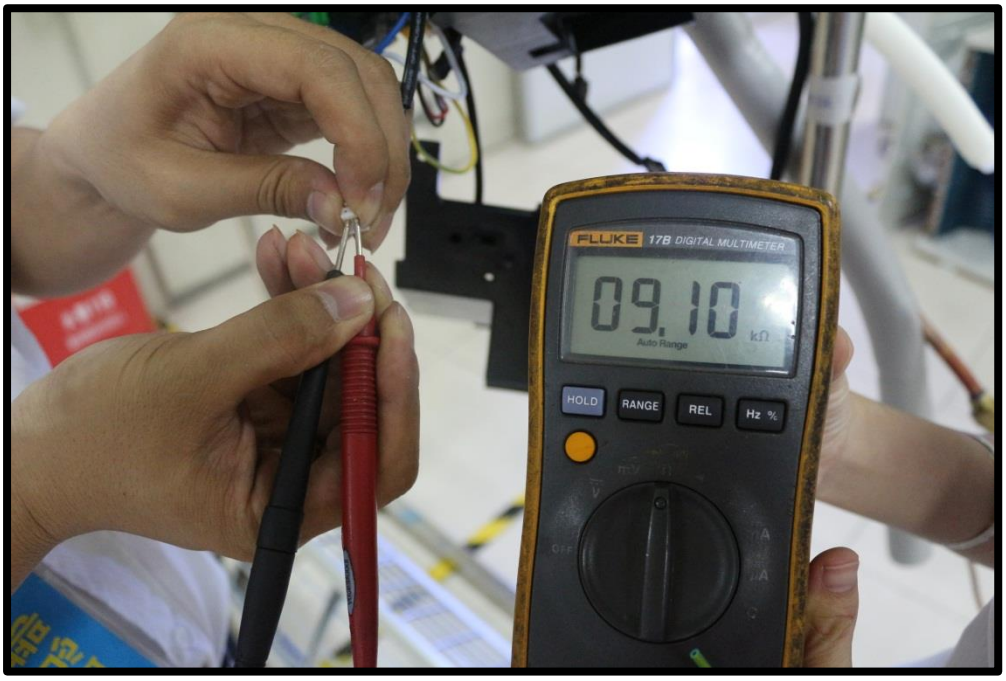

FLUKE 179 DIGITAL MULTIMETER
12.71
HOLD
RANGE
REL
Hz %

10.4.5 Open circuit or short circuit of temperature sensor diagnosis and solution(E5/E6)

Error Code	E5/E6
Malfunction decision conditions	If the sampling voltage is lower than 0.06V or higher than 4.94V, the LED will display the failure.
Supposed causes	• Wiring mistake • Sensor faulty

Trouble shooting:

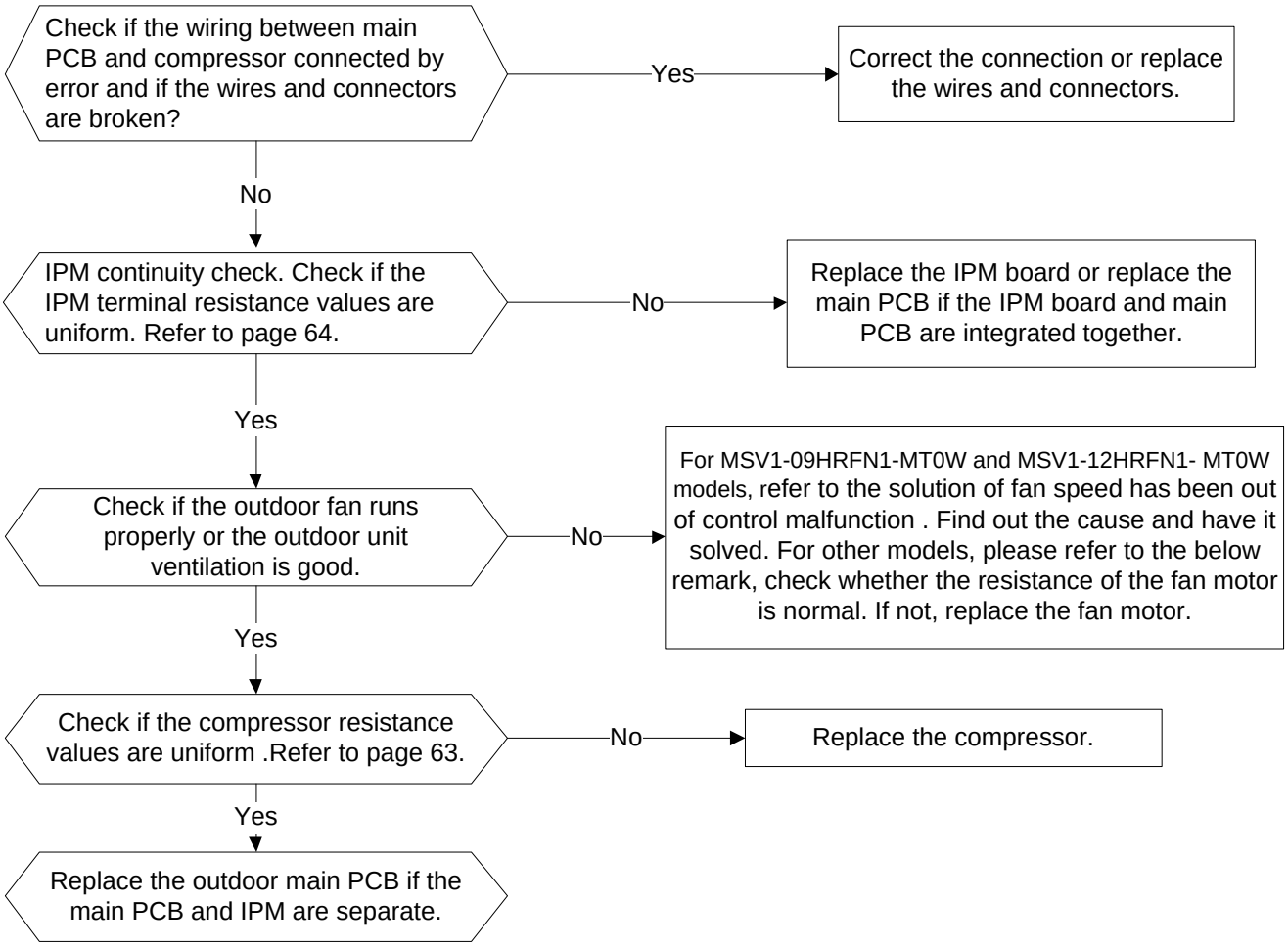




10.4.6 IPM malfunction or IGBT over-strong current protection diagnosis and solution(P0)

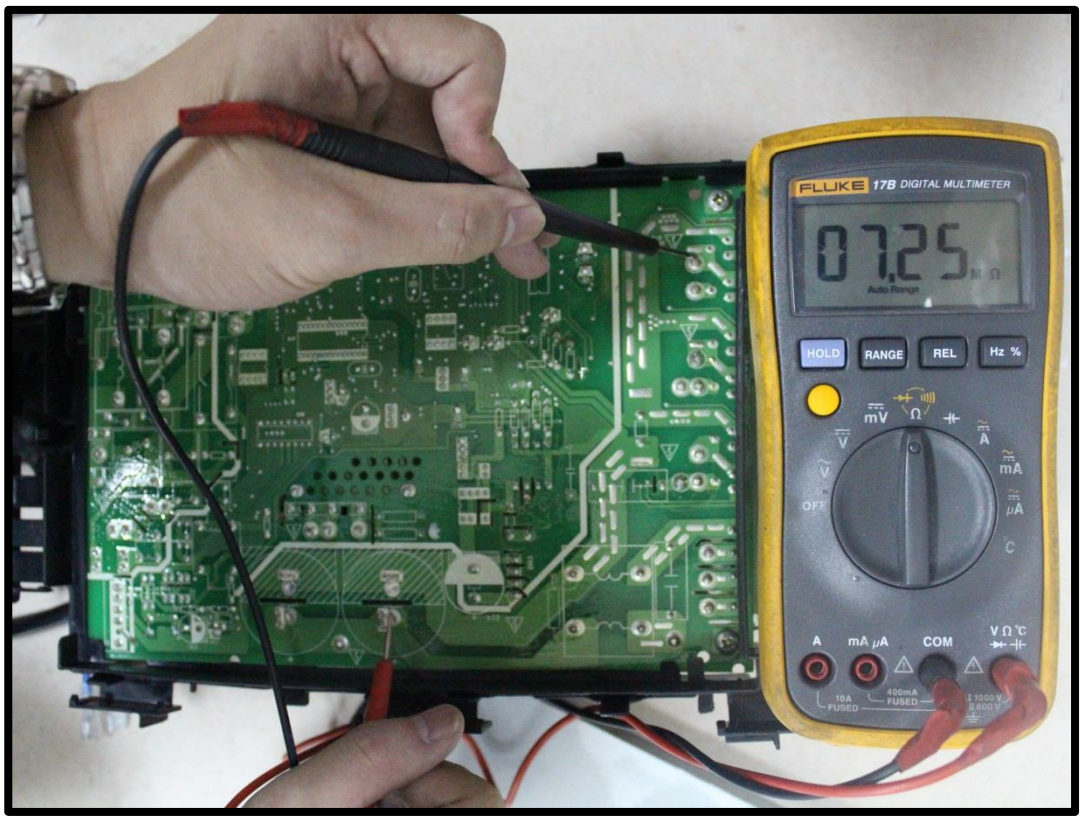
Error Code	P0
Malfunction decision conditions	When the voltage signal that IPM send to compressor drive chip is abnormal, the display LED will show “P0” and AC will turn off.
Supposed causes	• Wiring mistake • IPM malfunction • Outdoor fan ass’y faulty • Compressor malfunction • Outdoor PCB faulty

Trouble shooting:

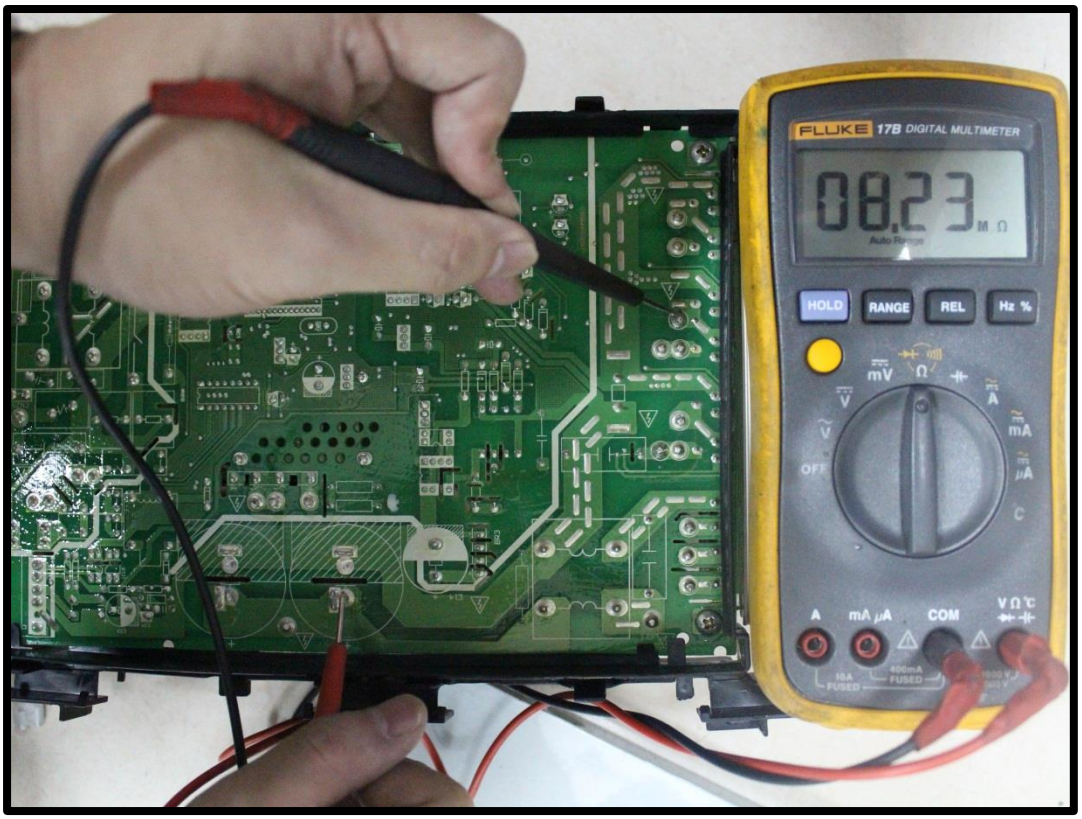


Remark：

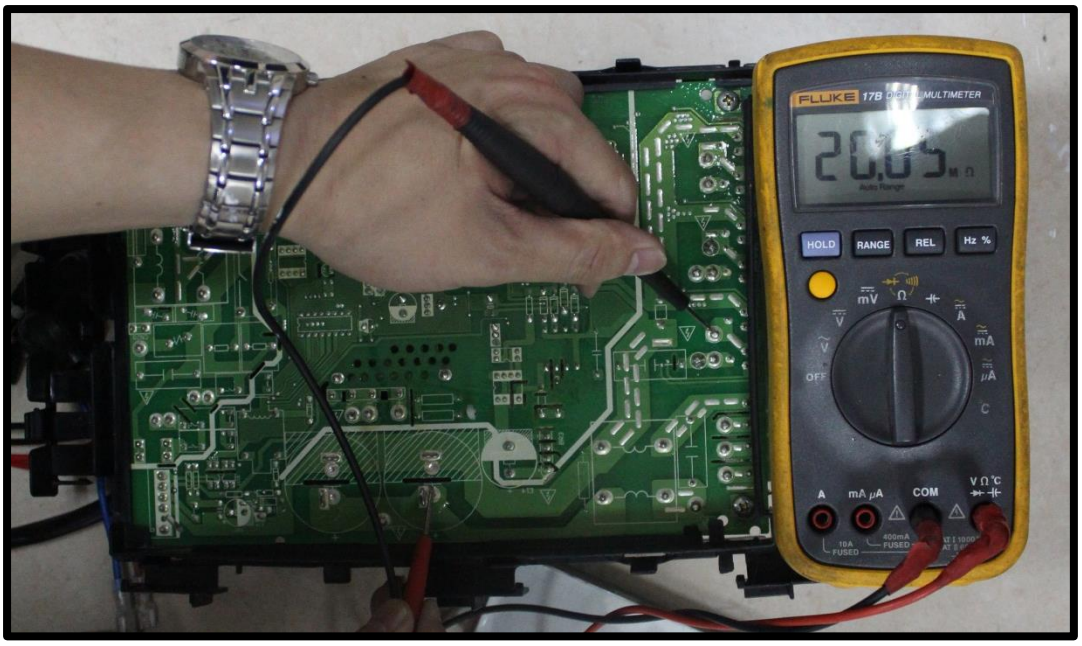
1) MSV1-12HRDN1-MQ0W model: Measure the **black** pin and **red** pin of the motor connector, the resistance should be around **293Ω** at 20℃(68℉)
2) MSV1-18HRDN1-MQ0W model: Measure the **black** pin and **red** pin of the motor connector, the resistance should be around **56Ω** at 20℃(68℉)
3) MSV1-24HRDN1-MQ0W model: Measure the **black** pin and **red** pin of the motor connector, the resistance should be around **56.5Ω** at 20℃(68℉)


FLUKE 17B DIGITAL MULTIMETER
07.25
HOLD
RANGE
REL
Hz %
A
mA μA
COM
V Ω °C

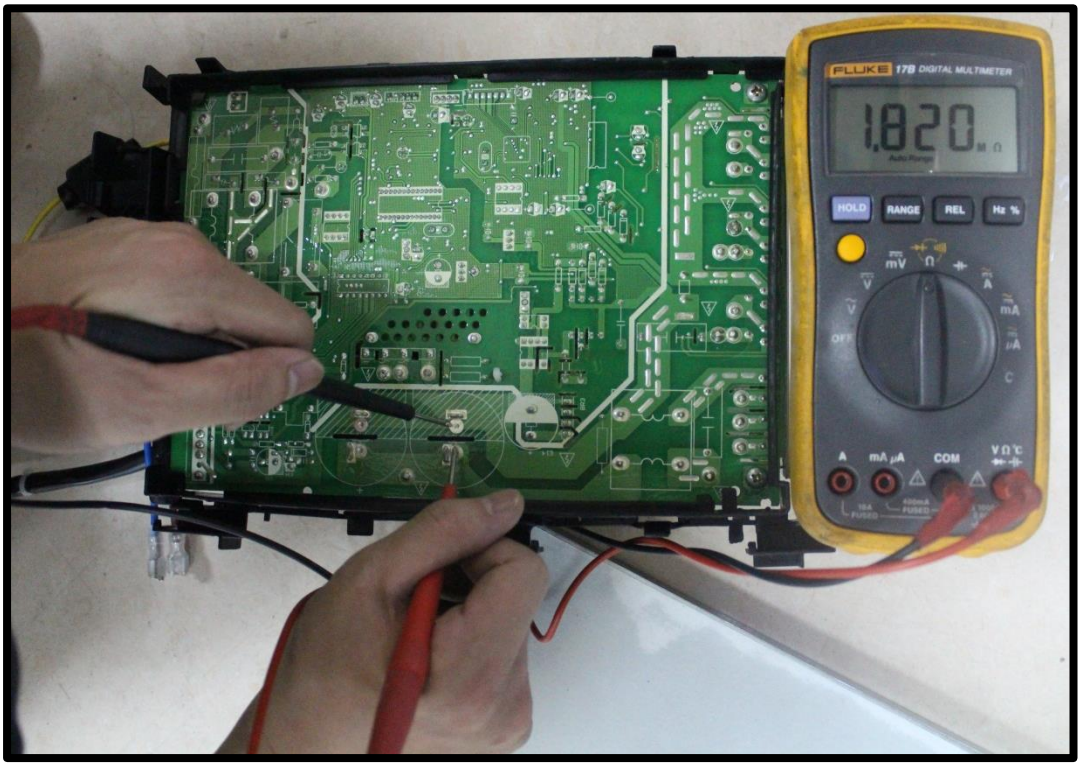
P-U


FLUKE 17B DIGITAL MULTIMETER
08.23
HOLD
RANGE
REL
Hz %
A
mA μA
COM
V Ω °C

P-V


FLUKE 17B DIGITAL MULTIMETER
HOLD
RANGE
REL
Hz %
COM

P-W

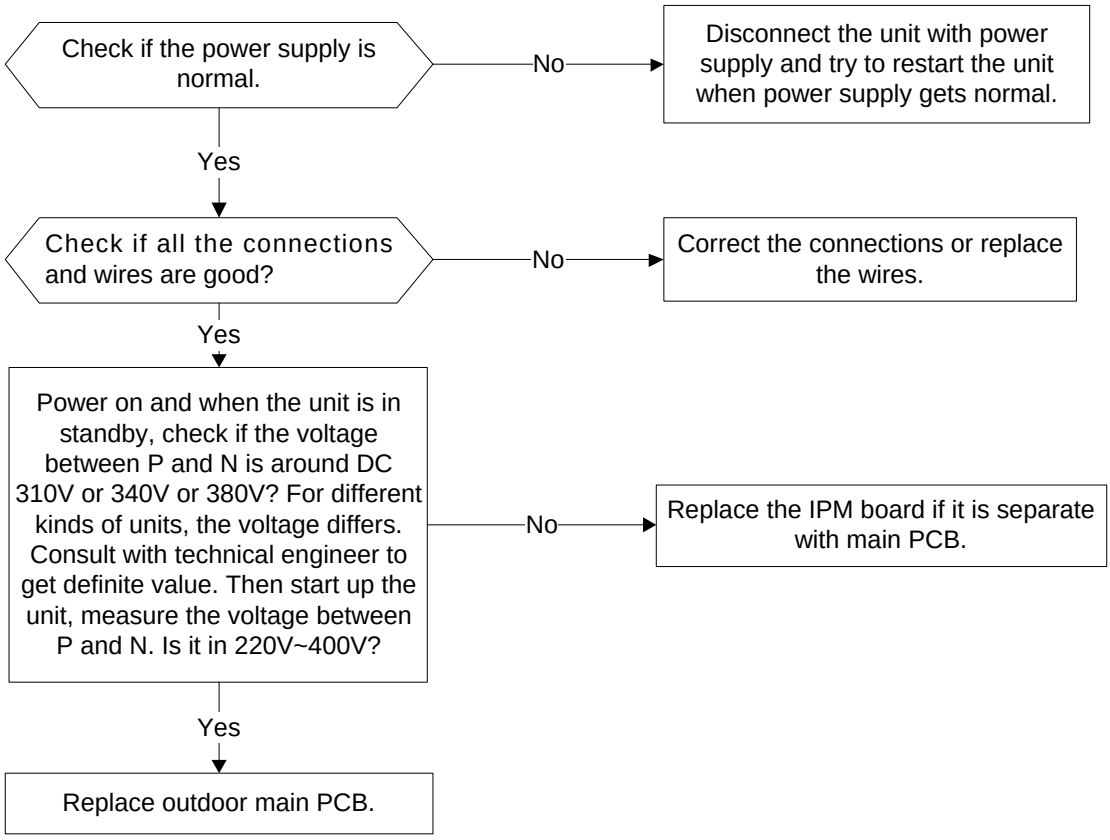

FLUKE 17B DIGITAL MULTIMETER
1.820
HOLD
RANGE
REL
Hz %
COM

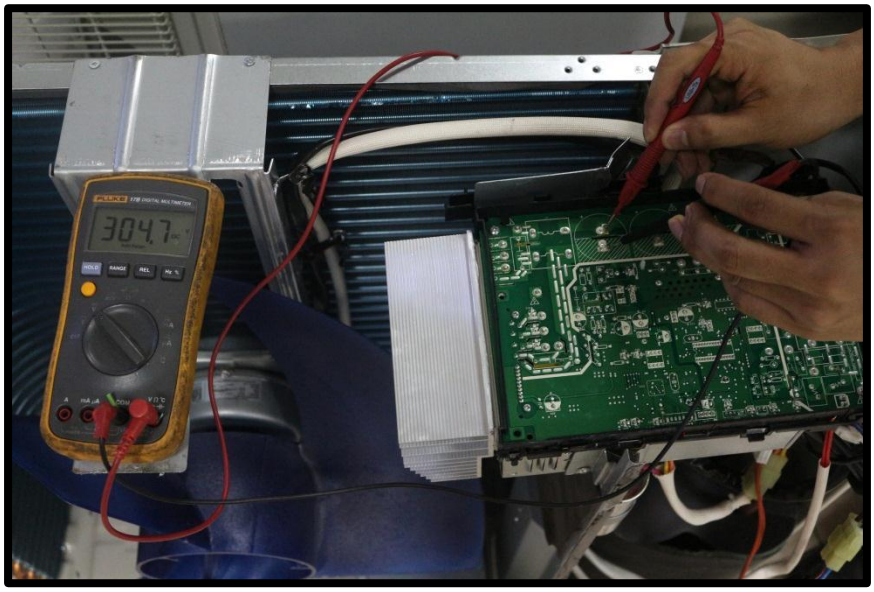
P-N

10.4.7 Over voltage or too low voltage protection diagnosis and solution(P1)

Error Code	**P1**
Malfunction decision conditions	**An abnormal voltage rise or drop is detected by checking the specified voltage detection circuit.**
Supposed causes	● **Power supply problems.** ● **System leakage or block** ● **PCB faulty**

Trouble shooting:



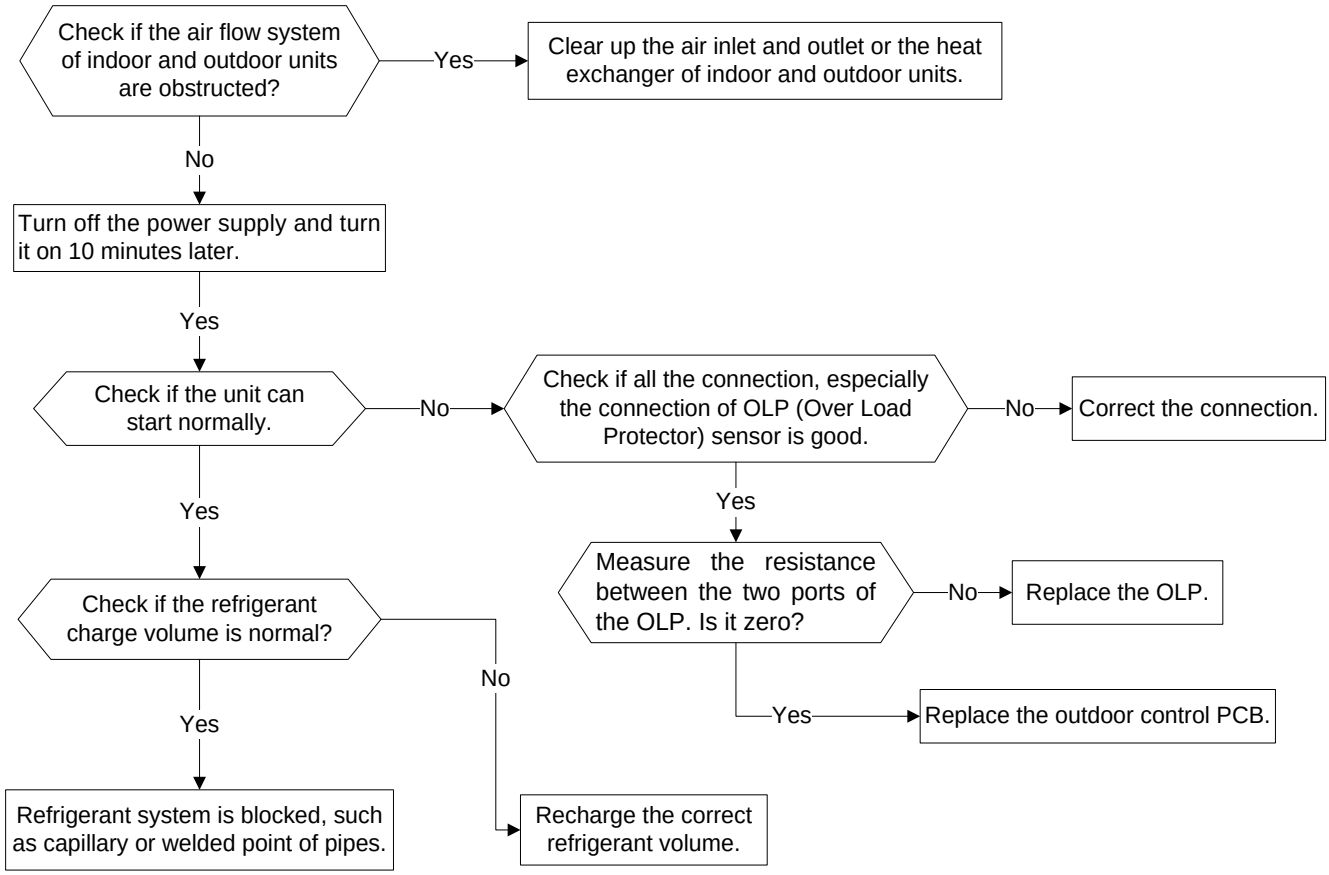


Remark:
Measure the DC voltage between P and N port. The normal value should be around 310V.

10.4.8 High temperature protection of compressor top diagnosis and solution(P2)

Error Code	**P2**
Malfunction decision conditions	**If the sampling voltage is not 5V, the LED will display the failure.**
Supposed causes	● **Power supply problems.** ● **System leakage or block** ● **PCB faulty**

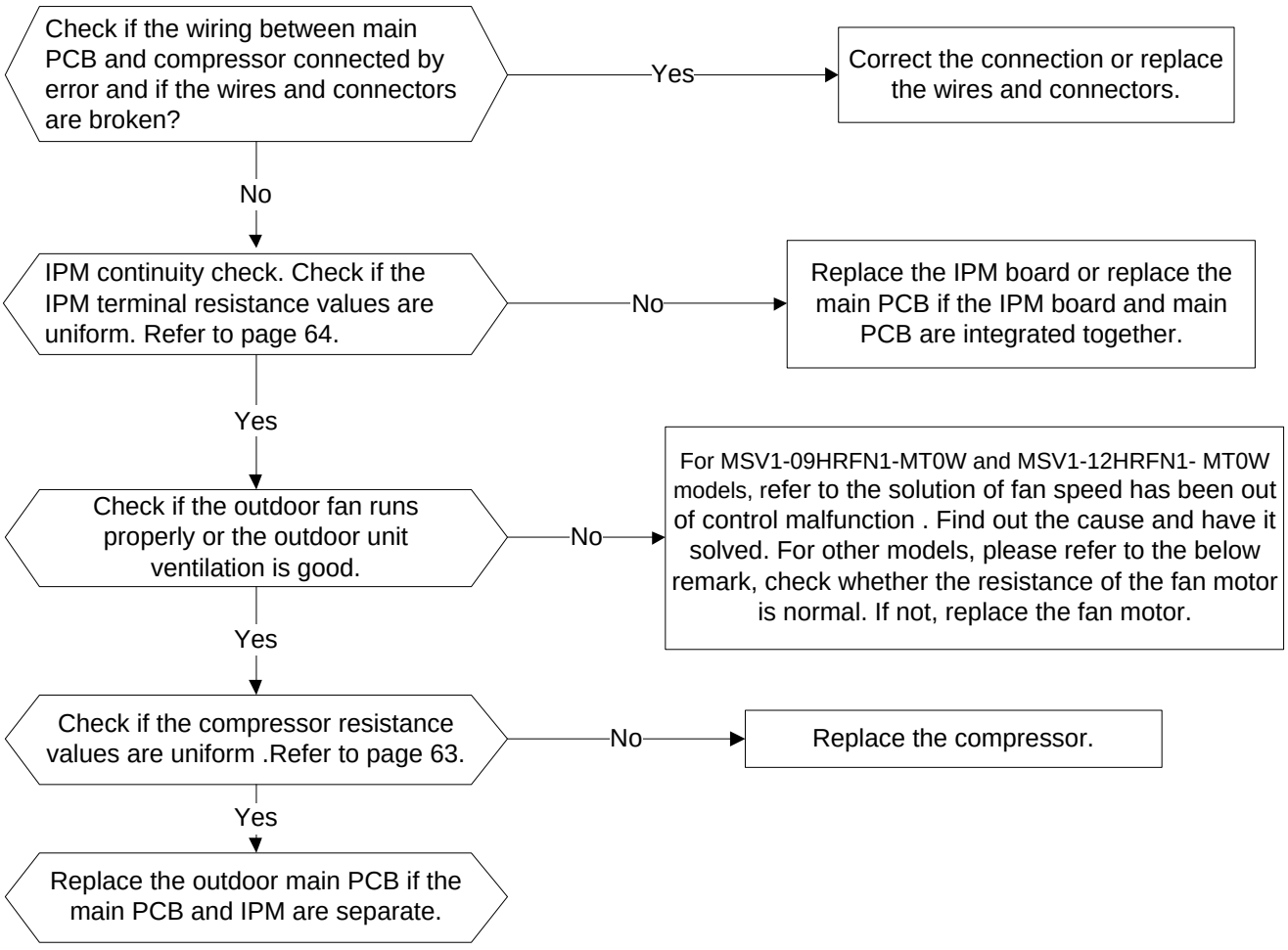
Trouble shooting:



10.4.9 Inverter compressor drive error diagnosis and solution(P4)

Error Code	P4
Malfunction decision conditions	**An abnormal inverter compressor drive is detected by a special detection circuit, including communication signal detection, voltage detection, compressor rotation speed signal detection and so on.**
Supposed causes	● **Wiring mistake** ● **IPM malfunction** ● **Outdoor fan ass'y faulty** ● **Compressor malfunction** ● **Outdoor PCB faulty**

Trouble shooting:



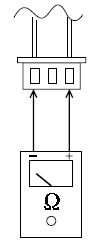
Remark:

1) MSV1-12HRDN1-MQ0W model: Measure the **black** pin and **red** pin of the motor connector, the resistance should be around **293Ω** at 20℃(68℉)
2) MSV1-18HRDN1-MQ0W model: Measure the **black** pin and **red** pin of the motor connector, the resistance should be around **56Ω** at 20℃(68℉)
3) MSV1-24HRDN1-MQ0W model: Measure the **black** pin and **red** pin of the motor connector, the resistance should be around **56.5Ω** at 20℃(68℉)

Main parts check

1. Temperature sensor checking

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



Tester

Temperature Sensors.

Room temp.(T1) sensor,

Indoor coil temp.(T2) sensor,

Outdoor coil temp.(T3) sensor,

Outdoor ambient temp.(T4) sensor,

Compressor discharge temp.(T5) sensor.

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

Appendix 1 Temperature Sensor Resistance Value Table for T1,T2,T3,T4 (℃--K)

℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm
-20	-4	115.266	20	68	12.6431	60	140	2.35774	100	212	0.62973
-19	-2	108.146	21	70	12.0561	61	142	2.27249	101	214	0.61148
-18	0	101.517	22	72	11.5	62	144	2.19073	102	216	0.59386
-17	1	96.3423	23	73	10.9731	63	145	2.11241	103	217	0.57683
-16	3	89.5865	24	75	10.4736	64	147	2.03732	104	219	0.56038
-15	5	84.219	25	77	10	65	149	1.96532	105	221	0.54448
-14	7	79.311	26	79	9.55074	66	151	1.89627	106	223	0.52912
-13	9	74.536	27	81	9.12445	67	153	1.83003	107	225	0.51426
-12	10	70.1698	28	82	8.71983	68	154	1.76647	108	226	0.49989
-11	12	66.0898	29	84	8.33566	69	156	1.70547	109	228	0.486
-10	14	62.2756	30	86	7.97078	70	158	1.64691	110	230	0.47256
-9	16	58.7079	31	88	7.62411	71	160	1.59068	111	232	0.45957
-8	18	56.3694	32	90	7.29464	72	162	1.53668	112	234	0.44699
-7	19	52.2438	33	91	6.98142	73	163	1.48481	113	235	0.43482
-6	21	49.3161	34	93	6.68355	74	165	1.43498	114	237	0.42304
-5	23	46.5725	35	95	6.40021	75	167	1.38703	115	239	0.41164
-4	25	44	36	97	6.13059	76	169	1.34105	116	241	0.4006
-3	27	41.5878	37	99	5.87359	77	171	1.29078	117	243	0.38991
-2	28	39.8239	38	100	5.62961	78	172	1.25423	118	244	0.37956
-1	30	37.1988	39	102	5.39689	79	174	1.2133	119	246	0.36954
0	32	35.2024	40	104	5.17519	80	176	1.17393	120	248	0.35982
1	34	33.3269	41	106	4.96392	81	178	1.13604	121	250	0.35042
2	36	31.5635	42	108	4.76253	82	180	1.09958	122	252	0.3413
3	37	29.9058	43	109	4.5705	83	181	1.06448	123	253	0.33246
4	39	28.3459	44	111	4.38736	84	183	1.03069	124	255	0.3239
5	41	26.8778	45	113	4.21263	85	185	0.99815	125	257	0.31559
6	43	25.4954	46	115	4.04589	86	187	0.96681	126	259	0.30754
7	45	24.1932	47	117	3.88673	87	189	0.93662	127	261	0.29974
8	46	22.5662	48	118	3.73476	88	190	0.90753	128	262	0.29216
9	48	21.8094	49	120	3.58962	89	192	0.8795	129	264	0.28482
10	50	20.7184	50	122	3.45097	90	194	0.85248	130	266	0.2777
11	52	19.6891	51	124	3.31847	91	196	0.82643	131	268	0.27078
12	54	18.7177	52	126	3.19183	92	198	0.80132	132	270	0.26408
13	55	17.8005	53	127	3.07075	93	199	0.77709	133	271	0.25757
14	57	16.9341	54	129	2.95896	94	201	0.75373	134	273	0.25125
15	59	16.1156	55	131	2.84421	95	203	0.73119	135	275	0.24512
16	61	15.3418	56	133	2.73823	96	205	0.70944	136	277	0.23916
17	63	14.6181	57	135	2.63682	97	207	0.68844	137	279	0.23338
18	64	13.918	58	136	2.53973	98	208	0.66818	138	280	0.22776
19	66	13.2631	59	138	2.44677	99	210	0.64862	139	282	0.22231

Appendix 2 Temperature Sensor Resistance Value Table for T5 (℃--K)

℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm	℃	℉	K Ohm
-20	-4	542.7	20	68	68.66	60	140	13.59	100	212	3.702
-19	-2	511.9	21	70	65.62	61	142	13.11	101	214	3.595
-18	0	483	22	72	62.73	62	144	12.65	102	216	3.492
-17	1	455.9	23	73	59.98	63	145	12.21	103	217	3.392
-16	3	430.5	24	75	57.37	64	147	11.79	104	219	3.296
-15	5	406.7	25	77	54.89	65	149	11.38	105	221	3.203
-14	7	384.3	26	79	52.53	66	151	10.99	106	223	3.113
-13	9	363.3	27	81	50.28	67	153	10.61	107	225	3.025
-12	10	343.6	28	82	48.14	68	154	10.25	108	226	2.941
-11	12	325.1	29	84	46.11	69	156	9.902	109	228	2.86
-10	14	307.7	30	86	44.17	70	158	9.569	110	230	2.781
-9	16	291.3	31	88	42.33	71	160	9.248	111	232	2.704
-8	18	275.9	32	90	40.57	72	162	8.94	112	234	2.63
-7	19	261.4	33	91	38.89	73	163	8.643	113	235	2.559
-6	21	247.8	34	93	37.3	74	165	8.358	114	237	2.489
-5	23	234.9	35	95	35.78	75	167	8.084	115	239	2.422
-4	25	222.8	36	97	34.32	76	169	7.82	116	241	2.357
-3	27	211.4	37	99	32.94	77	171	7.566	117	243	2.294
-2	28	200.7	38	100	31.62	78	172	7.321	118	244	2.233
-1	30	190.5	39	102	30.36	79	174	7.086	119	246	2.174
0	32	180.9	40	104	29.15	80	176	6.859	120	248	2.117
1	34	171.9	41	106	28	81	178	6.641	121	250	2.061
2	36	163.3	42	108	26.9	82	180	6.43	122	252	2.007
3	37	155.2	43	109	25.86	83	181	6.228	123	253	1.955
4	39	147.6	44	111	24.85	84	183	6.033	124	255	1.905
5	41	140.4	45	113	23.89	85	185	5.844	125	257	1.856
6	43	133.5	46	115	22.89	86	187	5.663	126	259	1.808
7	45	127.1	47	117	22.1	87	189	5.488	127	261	1.762
8	46	121	48	118	21.26	88	190	5.32	128	262	1.717
9	48	115.2	49	120	20.46	89	192	5.157	129	264	1.674
10	50	109.8	50	122	19.69	90	194	5	130	266	1.632
11	52	104.6	51	124	18.96	91	196	4.849			
12	54	99.69	52	126	18.26	92	198	4.703			
13	55	95.05	53	127	17.58	93	199	4.562			
14	57	90.66	54	129	16.94	94	201	4.426			
15	59	86.49	55	131	16.32	95	203	4.294			
16	61	82.54	56	133	15.73	96	205	4.167			
17	63	78.79	57	135	15.16	97	207	4.045			
18	64	75.24	58	136	14.62	98	208	3.927			
19	66	71.86	59	138	14.09	99	210	3.812			

Appendix 3:

℃	10	11	12	13	14	15	16	17	18	19	20	21	22
℉	48	50	52	54	56	58	60	62	64	66	68	70	72
℃	23	24	25	26	27	28	29	30	31	32	33	34	35
℉	74	76	78	80	82	84	86	88	90	92	94	96	98

Spec.

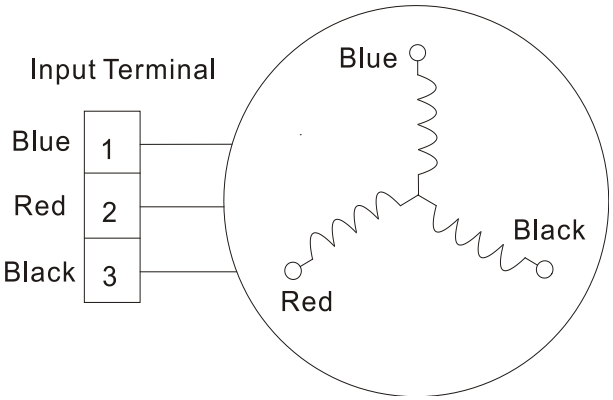
Code	2T0032300361	2T0032500279	2T0032500244
Model	MSV1-09HRFN1-MT0W	MSV1-12HRFN1- MT0W	MSV1-12HRDN1-MQ0W
Compressor	DA108X1C-20FZ3	DA108X1C-20FZ3	DA108X1C-20FZ3
Indoor fan motor	WZDK20-38G(☆)	WZDK20-38G(☆)	RPG20B
Outdoor fan motor	WZDK35-38G (☆)	WZDK35-38G (☆)	YDK24-6GB

Code	2T0032700154	2T0033000227
Model	MSV1-18HRDN1-MQ0W	MSV1-24HRDN1-MQ0W
Compressor	DA150S1C-20FZ	DA150S1C-20FZ
Indoor fan motor	YDK36-4CB(A)	YDK36-4CB(A)
Outdoor fan motor	YDK53-6FB	YDK53-6NB

Note: The motor marked "☆" means DC fan motor with control chip inside the fan motor.

2.Compressor checking

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



Position	Resistance Value	
	DA108X1C-20FZ3	DA150S1C-20FZ
Blue - Red	0.71Ω (20℃/68℉)	0.95Ω (20℃/68℉)
Blue - Black		
Red - Blue		

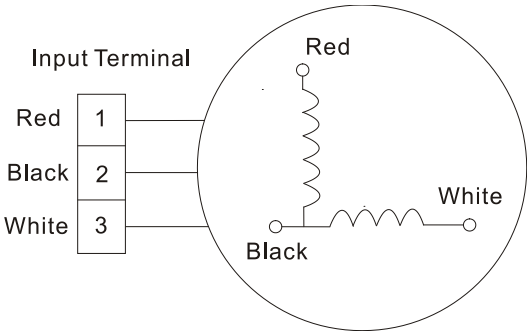
3. IPM continuity check

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

Digital tester		Normal resistance value	Digital tester		Normal resistance value
(+)Red	(-)Black		(+)Red	(-)Black	
P	N	∞ (Several MΩ)	U	N	∞ (Several MΩ)
	U		V		
	V		W		
	W		(+)Red		

4: Indoor AC Fan Motor

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



Position	Resistance Value	
	RPG20B	
Black - Red	381Ω±8% (20℃/68℉) (Brand: Weiling)	342Ω±8% (20℃/68℉) (Brand: Dayang)
White - Black	267Ω±8% (20℃/68℉) (Brand: Weiling)	253Ω±8% (20℃/68℉) (Brand: Dayang)

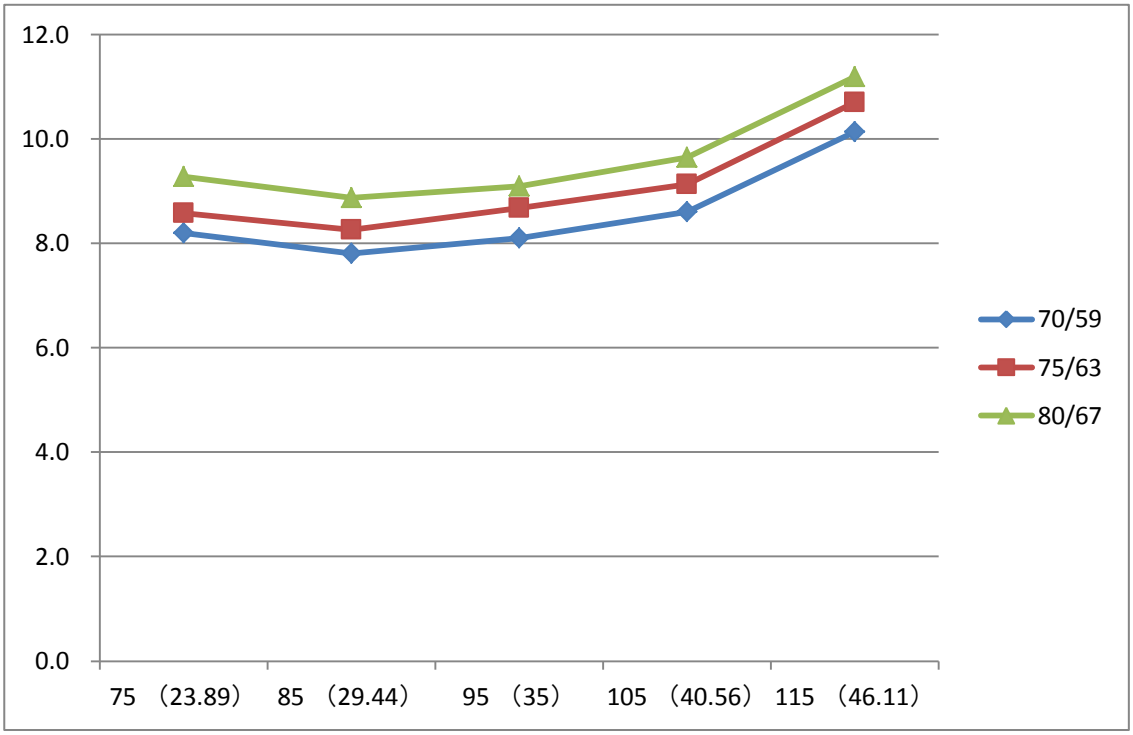
5: Pressure On Service Port

Cooling chart:

℉ (℃)	IDT / ODT	75 （23.89）	85 （29.44）	95 （35）	105 （40.56）	115 （46.11）
BAR	70/59	8.2	7.8	8.1	8.6	10.1
BAR	75/63	8.6	8.3	8.7	9.1	10.7
BAR	80/67	9.3	8.9	9.1	9.6	11.2

℉ (℃)	IDT / ODT	75 （23.89）	85 （29.44）	95 （35）	105 （40.56）	115 （46.11）
PSI	70/59	119	113	117	125	147
PSI	75/63	124	120	126	132	155
PSI	80/67	135	129	132	140	162

℉ (℃)	IDT / ODT	75 （23.89）	85 （29.44）	95 （35）	105 （40.56）	115 （46.11）
MPA	70/59	0.82	0.78	0.81	0.86	1.01
MPA	75/63	0.86	0.83	0.87	0.91	1.07
MPA	80/67	0.93	0.89	0.91	0.96	1.12

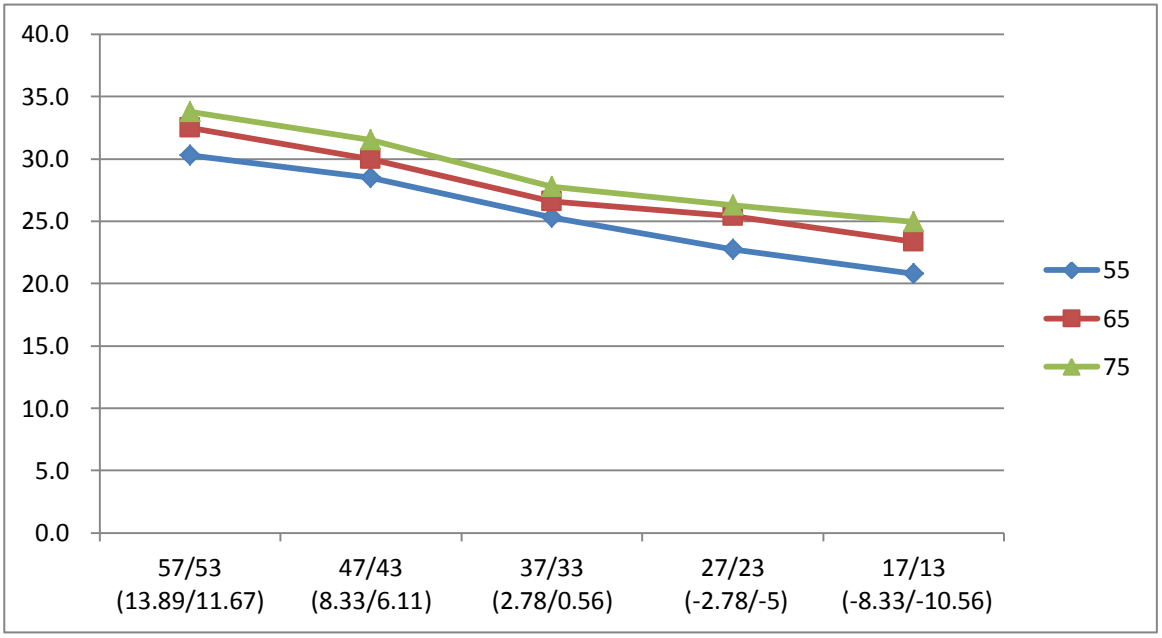


Heating Chart:

℉ (℃)	IDT ODT	57/53 (13.89/11.67)	47/43 (8.33/6.11)	37/33 (2.78/0.56)	27/23 (-2.78/-5)	17/13 (-8.33/-10.56)
BAR	55	30.3	28.5	25.3	22.8	20.8
BAR	65	32.5	30.0	26.6	25.4	23.3
BAR	75	33.8	31.5	27.8	26.3	24.9

℉ (℃)	IDT ODT	57/53 (13.89/11.67)	47/43 (8.33/6.11)	37/33 (2.78/0.56)	27/23 (-2.78/-5)	17/13 (-8.33/-10.56)
PSI	55	439	413	367	330	302
PSI	65	471	435	386	368	339
PSI	75	489	457	403	381	362

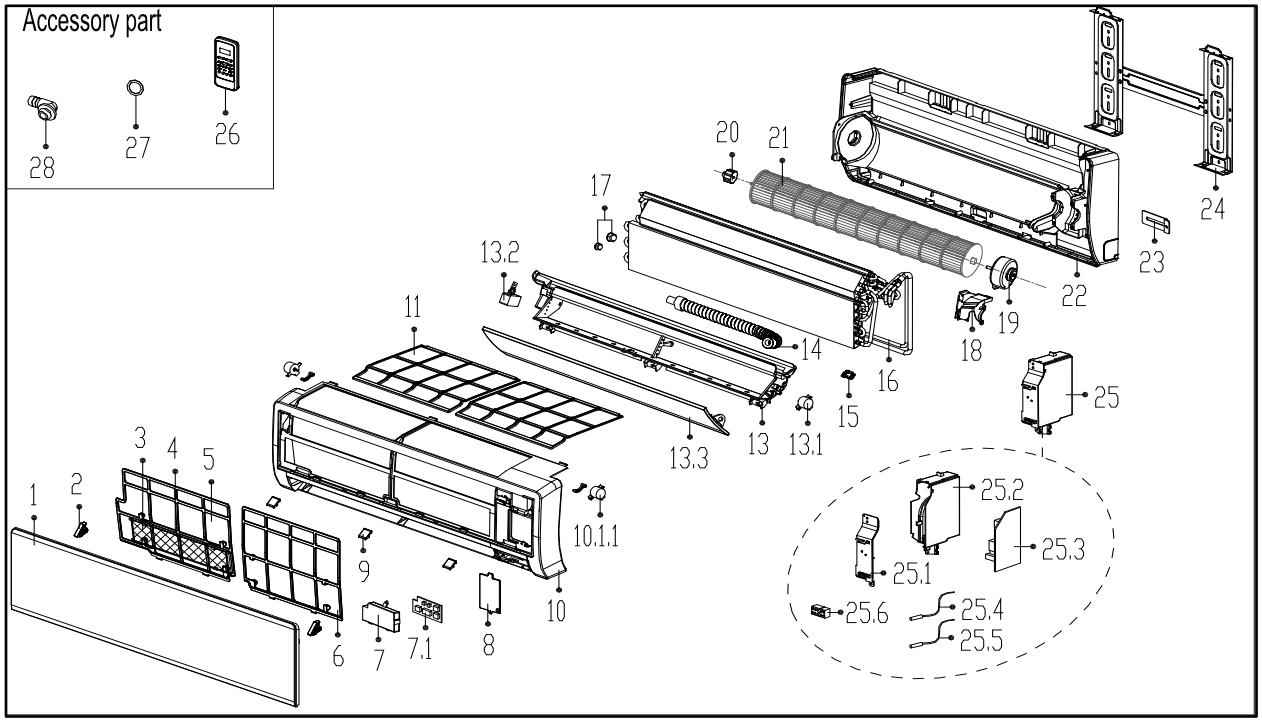
℉ (℃)	IDT ODT	57/53 (13.89/11.67)	47/43 (8.33/6.11)	37/33 (2.78/0.56)	27/23 (-2.78/-5)	17/13 (-8.33/-10.56)
MPA	55	3.03	2.85	2.53	2.28	2.08
MPA	65	3.25	3.00	2.66	2.54	2.33
MPA	75	3.38	3.15	2.78	2.63	2.49



11. Exploded View(Version of 2013.05.08)

11.1 Indoor unit

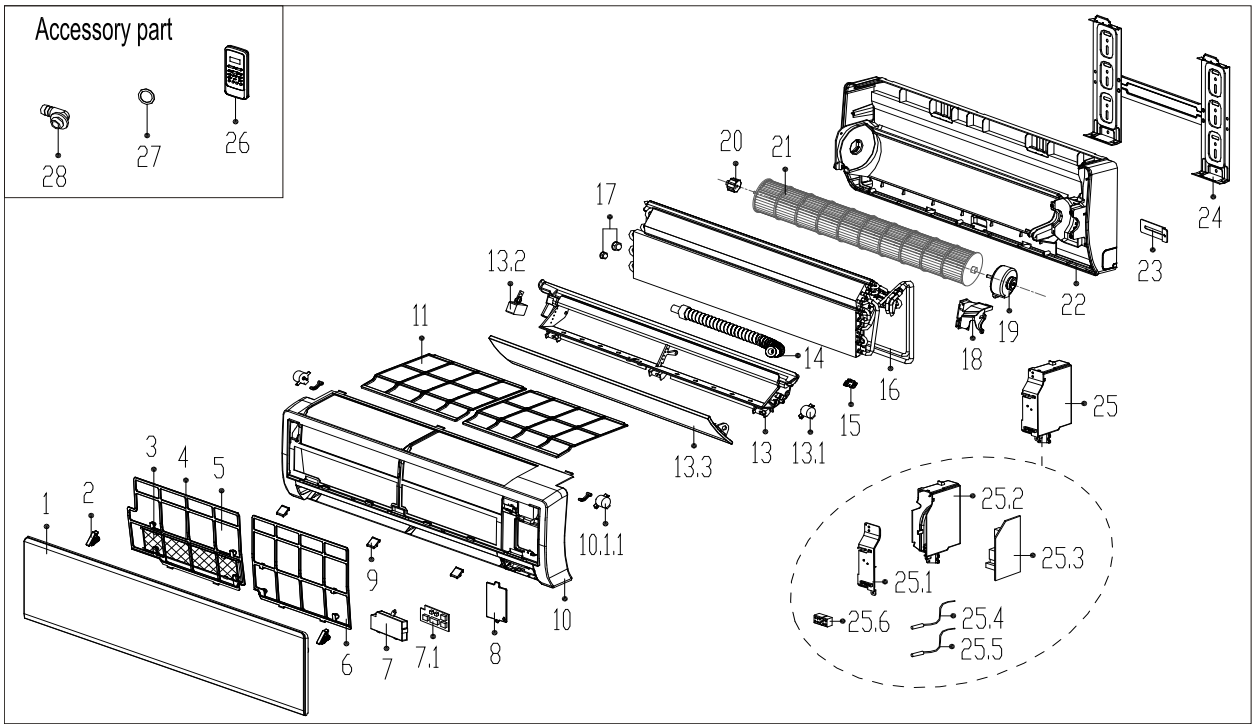
MSV1-09HRFN1-MT0W:



No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Panel assembly	1	201132590008	16	Evaporator assembly	1	201532390036
2	Hinge Slide groove	2	201132500010	17	Pipe nut	1	201600330002
3	Air cleaner	1	201131410703	17	Pipe nut	1	201600330001
4	Bracket of air filter	1	201132200713	18	Fan motor cover	1	201132500017
5	Air filter(left)	1	201132500013	19	Asynchronous motor	1	202400370022
6	Air filter(right)	1	201132500011	20	Bearing base	1	202730100201
7	Display box assembly	1	203332590183	21	Cross flow fan	1	201100200106
7.1	Display board	1	201332590136	22	Chassis assembly	1	201132500007
8	Cover of indoor electronic control box	1	201132500012	23	Pipe clamp board	1	201232500001
9	Screw cap	3	201132500055	24	Installation plate	1	201232590025
10	Panel frame assembly	1	201132501024	25	Electronic control box assembly	1	203332390677
10.1	Panel frame assembly	1	201132501131	25.1	Cover of electronic control box	1	201132500021
10.1.1	Louver motor	1	202400200105	25.2	Electronic control box	1	201132500022
11	Air inlet grille assembly	1	201132500054	25.3	Main control board assembly	1	201332390823
13	Air outlet assembly	1	201132590968	25.4	Ambient temperature sensor assembly	1	202433190000
13.1	Louver motor	1	202400200017	25.5	Pipe temperature	1	202301300080

13.2	Ionizer generator	1	202403000006	25.6	Wire joint	1	202301450119
13.3	Horizontal louver	1	201132500060	26	Remote Controller	1	203355091200
14	Drain hose	1	201101020038	27	Seal ring	1	202720090001
15	Fix clamp of temperature sensor	1	201102000305	28	Drain connecter	1	201101020011

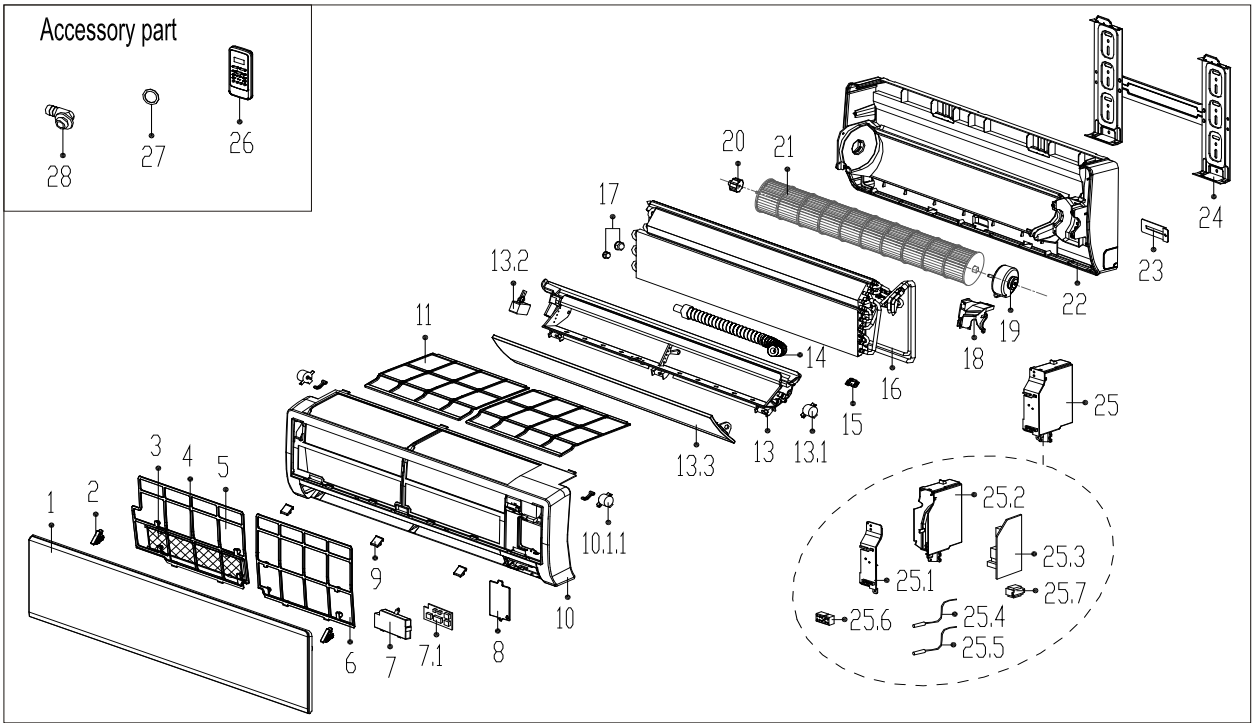
MSV1-12HRFN1- MT0W:



No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Panel assembly	1	201132590008	16	Evaporator assembly	1	201532590004
2	Hinge slide groove	2	201132500010	17	Pipe nut	1	201600330003
3	Air cleaner	1	201131410703	17	Pipe nut	1	201600330001
4	Bracket of air filter	1	201132200713	18	Fan motor cover	1	201132500017
5	Air filter(left)	1	201132500013	19	Asynchronous motor	1	202400370022
6	Air filter(right)	1	201132500011	20	Bearing base	1	202730100201
7	Display box assembly	1	203332590183	21	Cross flow fan	1	201100200106
7.1	Display board	1	201332590136	22	Chassis assembly	1	201132500007
8	Cover of indoor electronic control box	1	201132500012	23	Pipe clamp board	1	201232500001
9	Screw cap	3	201132500055	24	Installation plate	1	201232590025
10	Panel frame assembly	1	201132501024	25	Electronic control box assembly	1	203332590475
10.1	Panel frame assembly	1	201132501131	25.1	Cover of electronic control box	1	201132500021
10.1.1	Louver motor	1	202400200105	25.2	Electronic control box	1	201132500022
11	Air inlet grille	1	201132500054	25.3	Main control board	1	201332590549
13	Air outlet assembly	1	201132590968	25.4	Ambient temperature sensor assembly	1	202433190000
13.1	Louver motor	1	202400200017	25.5	Pipe temperature sensor assembly	1	202301300080
13.2	Ionizer generator	1	202403000006	25.6	Wire joint	1	202301450119
13.3	Horizontal louver	1	201132500060	26	Remote Controller	1	203355091200

14	Drain hose	1	201101020038	27	Seal ring	1	202720090001
15	Fix clamp of temperature sensor	1	201102000305	28	Drain connecter	1	201101020011

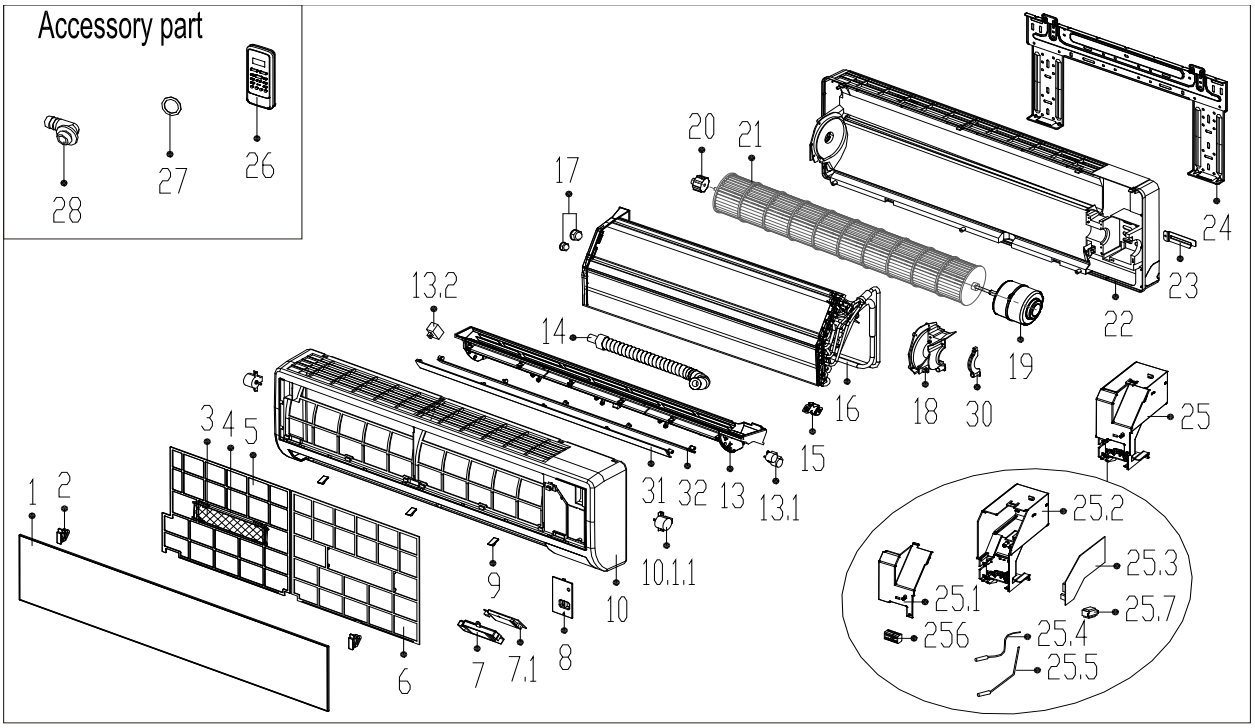
MSV1-12HRDN1-MQ0W



No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Panel assembly	1	201132590008	17	Pipe nut	1	201600330003
2	Hinge Slide groove	2	201132500010	17	Pipe nut	1	201600330001
3	Air cleaner	1	201131410703	18	Fan motor cover	1	201132500017
4	Bracket of air filter	1	201132200713	19	Asynchronous motor	1	202400300137
5	Air filter(left)	1	201132500013	20	Bearing base	1	202730100201
6	Air filter(right)	1	201132500011	21	Cross flow fan	1	201100200106
7	Display box assembly	1	203332590183	22	Chassis assembly	1	201132500007
7.1	Display board	1	201332590136	23	Pipe clamp board	1	201232500001
8	Cover of indoor electronic control box	1	201132500012	24	Installation plate	1	201232590025
9	Screw cap	3	201132500055	25	Electronic control box assembly	1	203332590441
10	Panel frame assembly	1	201132501024	25.1	Cover of electronic control box	1	201132500021
10.1	Panel frame assembly	1	201132501131	25.2	Electronic control box	1	201132500022
10.1.1	Louver motor	1	202400200105	25.3	Main control board assembly	1	201332590506
11	Air inlet grille assembly	1	201132500054	25.4	Ambient temperature sensor assembly	1	202433190000
13	Air outlet assembly	1	201132590969	25.5	Pipe temperature sensor assembly	1	202301300080
13.1	Louver motor	1	202400200017	25.6	Wire joint	1	202301450119
13.2	Ionizer generator	1	202403000006	25.7	Transformer	1	202300900097

13.3	Horizontal louver	1	201132500060	26	Remote Controller	1	203355091200
14	Drain hose	1	201101020038	27	Seal ring	1	202720090001
15	Fix clamp of temperature sensor	1	201102000305	28	Drain connecter	1	201101020011
16	Evaporator assembly	1	201532590004				

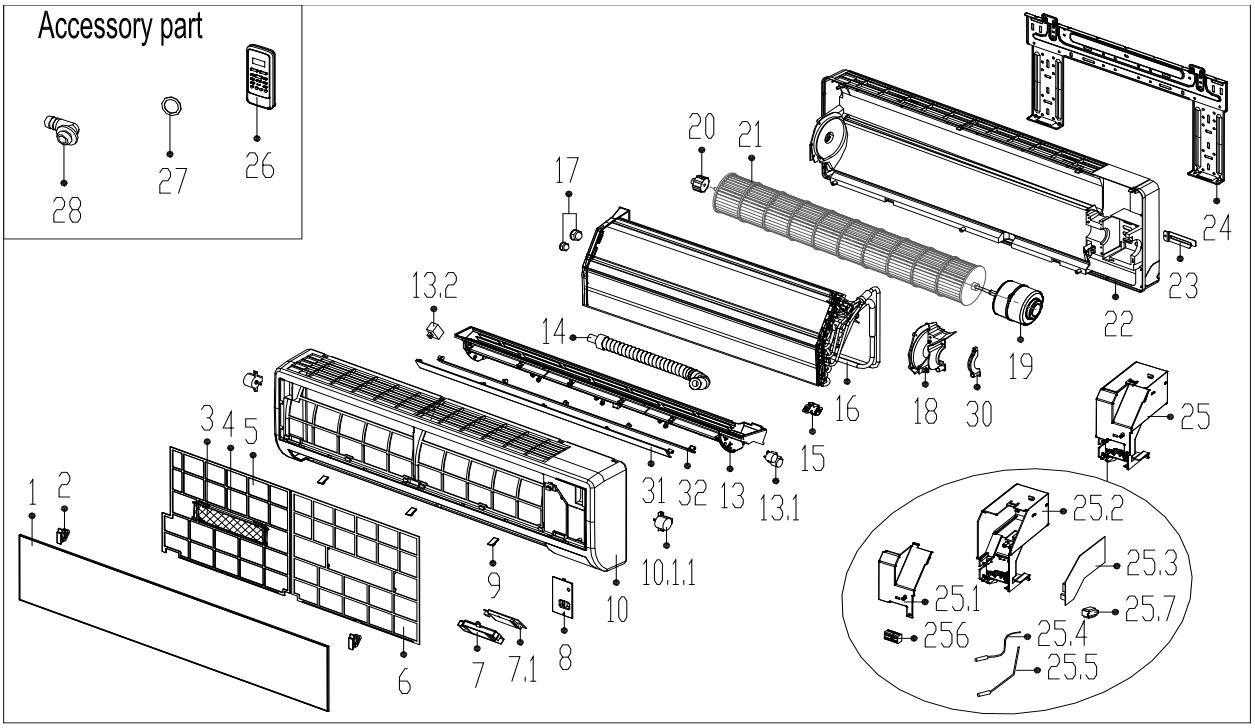
MSV1-18HRDN1-MQ0W



No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Panel assembly	1	201133090178	18	Fan motor cover	1	201133090176
2	Hinge Slide groove	2	201132890023	19	Asynchronous motor	1	202400400931
3	Air cleaner	1	201131410703	20	Bearing base	1	202730100201
4	Bracket of air filter	1	201132200713	21	Cross flow fan	1	201100200110
5	Air filter(left)	1	201133090174	22	Chassis assembly	1	201133090180
6	Air filter(right)	1	201133090177	23	Pipe clamp board	1	201232800103
7	Display box assembly	1	203332890007	24	Installation plate	1	201232990002
7.1	Display board assembly	1	201332890026	25	Electronic control box assembly	1	203333090278
8	Cover of indoor electronic control box	1	201133090170	25.1	Cover of electronic control box	1	201133090166
9	Screw cap	3	201133090175	25.2	Electronic control box	1	201133090165
10	Panel frame assembly	1	201133090914	25.3	Main control board assembly	1	201333090372
10.1	Panel frame assembly	1	201133090214	25.4	Ambient temperature sensor assembly	1	202301300210
10.1.1	Louver motor	1	202400200109	25.5	Pipe temperature sensor assembly	1	202301300077
13	Air outlet assembly	1	201133091001	25.6	Wire joint	1	202301450119
13.1	Louver motor	1	202400200004	25.7	Transformer	1	202300900166
13.2	Ionizer generator	1	202403000003	26	Remote Controller	1	203355091200
14	Drain hose	1	201101020038	27	Seal ring	1	202720090001
15	Fix clamp of temperature sensor	1	201102000305	28	Drain connecter	1	201101020011

16	Evaporator assembly	1	201532890103	30	Fixing board of fan motor	1	201133090167
17	Pipe nut	1	201600330001	31	Horizontal louver (above)	1	201133091003
17	Pipe nut	1	201600330003	32	Horizontal louver (below)	1	201133091002

MSV1-24HRDN1-MQ0W

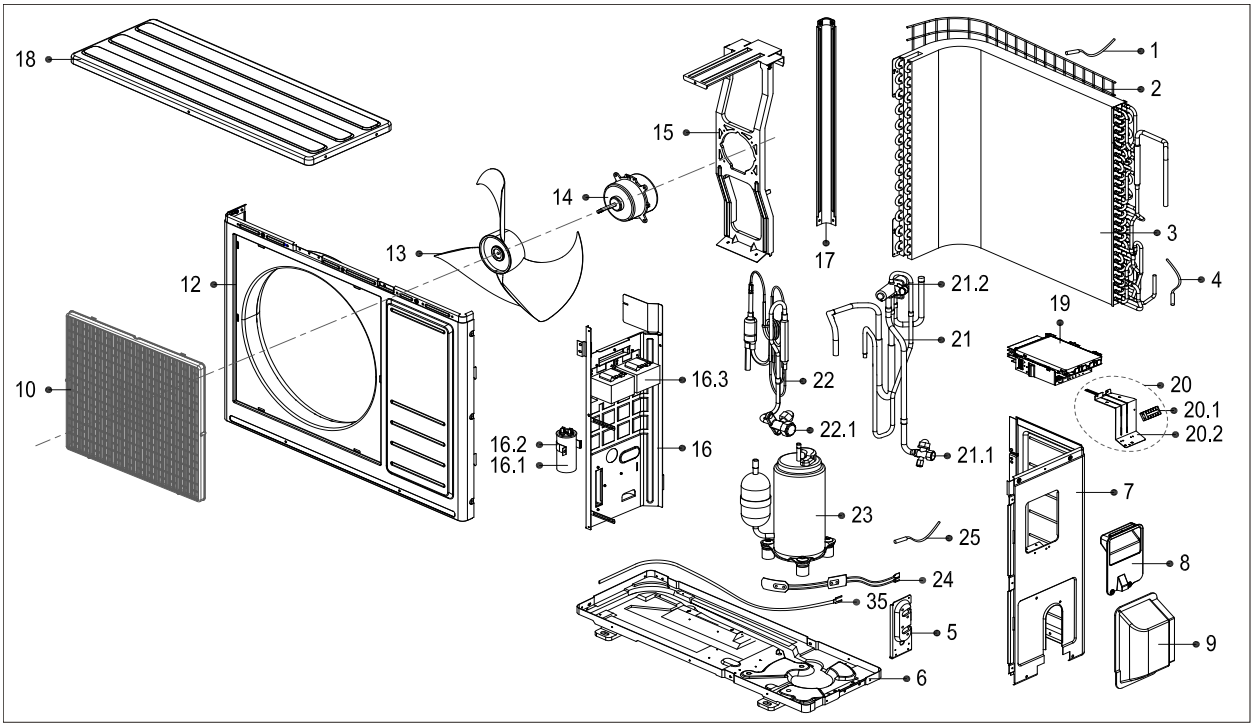


No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Panel assembly	1	201133090178	18	Fan motor cover	1	201133090176
2	Hinge Slide groove	2	201132890023	19	Asynchronous motor	1	202400400931
3	Air cleaner	1	201131410703	20	Bearing base	1	202730100201
4	Bracket of air filter	1	201132200713	21	Cross flow fan	1	201100200110
5	Air filter(left)	1	201133090174	22	Chassis assembly	1	201133090180
6	Air filter(right)	1	201133090177	23	Pipe clamp board	1	201232800103
7	Display box assembly	1	203332890007	24	Installation plate	1	201232990002
7.1	Display board assembly	1	201332890026	25	Electronic control box assembly	1	203333090277
8	Cover of indoor electronic control box	1	201133090170	25.1	Cover of electronic control box	1	201133090166
9	Screw cap	3	201133090175	25.2	Electronic control box	1	201133090165
10	Panel frame assembly	1	201133090914	25.3	Main control board assembly	1	201333090371
10.1	Panel frame assembly	1	201133090214	25.4	Ambient temperature sensor assembly	1	202301300210
10.1.1	Louver motor	1	202400200109	25.5	Pipe temperature sensor assembly	1	202301300077
13	Air outlet assembly	1	201133091001	25.6	Wire joint	1	202301450119
13.1	Louver motor	1	202400200004	25.7	Transformer	1	202300900166
13.2	Ionizer generator	1	202403000003	26	Remote Controller	1	203355091200
14	Drain hose	1	201101020038	27	Seal ring	1	202720090001
15	Fix clamp of temperature sensor	1	201102000305	28	Drain connecter	1	201101020011

16	Evaporator assembly	1	201533090113	30	Fixing board of fan motor	1	201133090167
17	Pipe nut	1	201600330002	31	Horizontal louver (above)	1	201133091003
17	Pipe nut	1	201600330004	32	Horizontal louver (below)	1	201133091002

11.2 Outdoor unit

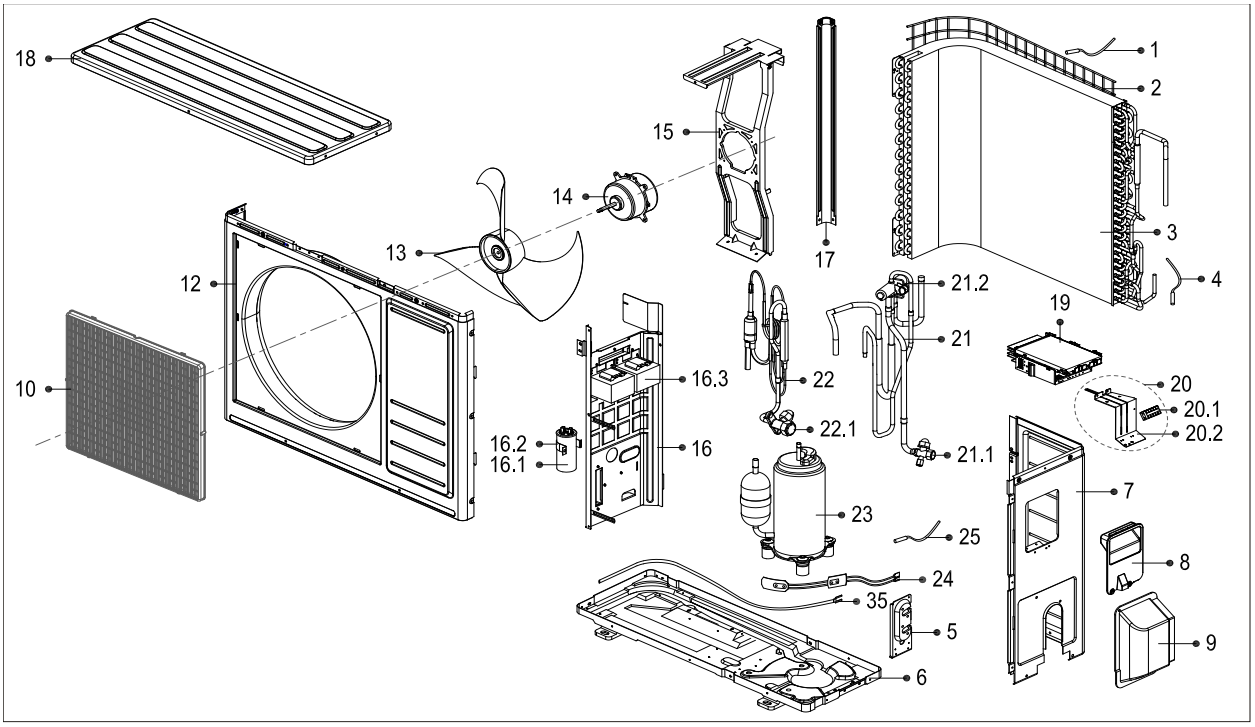
MOC-09HFN1-MTOW



No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Ambient temperature sensor assembly	1	202301310063	16.3	Reactance	1	202301000820
2	Rear net	1	2011374G0003	16.3	Reactance	1	202301000819
3	Condenser assembly	1	201537390033	17	Left supporter	1	201237400400
4	Pipe temperature sensor assembly	1	202440500004	18	Top cover assembly	1	201237900028
5	Valve plate	1	201237200282	19	Electronic control box assembly	1	203337390156
6	Chassis assembly	1	201237590091	20	Terminal board assembly	1	203337590049
7	Rear right clapboard assembly	1	201237590080	20.1	Wire joint	1	202301400223
8	Big handle	1	201237390104	20.2	Terminal board	1	201237590046
9	Water collector	1	201137400000	21	4-Ways valve assembly	1	201637391538
10	Air outlet grille	1	201137590017	21.1	Gas valve	1	201600720095
12	Front panel	1	201237400392	21.2	4-Ways valve	1	201600690010
13	Axial flow fan	1	201100390002	22	Liquid valve assembly	1	201637391361
14	Asynchronous motor	1	202400370023	22.1	Liquid valve	1	201600740523
15	Supporter assembly of fan motor	1	201237390026	23	Compressor	1	201400620600
16	Partition board assembly	1	201237500213	24	Crankcase electric heater	1	202403100501

16.1	Capacitor of compressor	1	202401000612	25	Discharge temperature sensor	1	202301310068
16.2	Capacitor clip	1	201200100002	35	Electric heater of chassis	1	202403100187

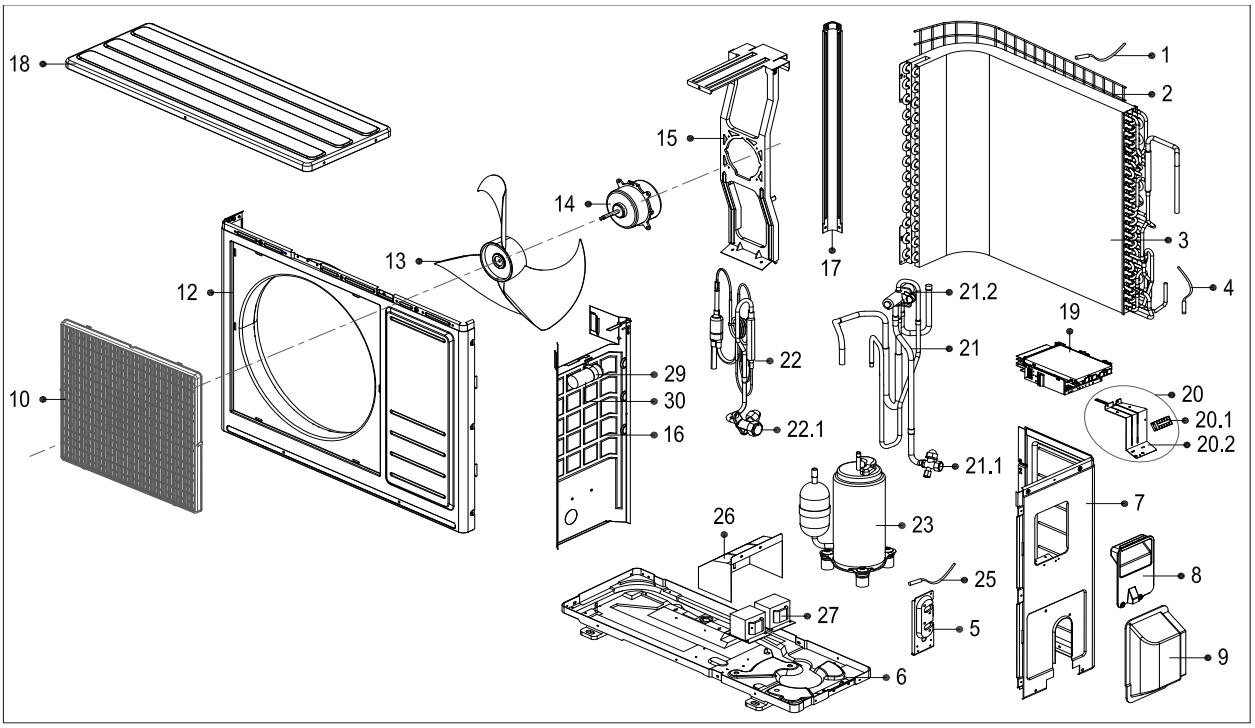
MOC-12HFN1-MTOW



No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Ambient temperature sensor assembly	1	202301310063	16.3	Reactance	1	202301000820
2	Rear net	1	2011374G0003	16.3	Reactance	1	202301000819
3	Condenser assembly	1	201537490008	17	Left supporter	1	201237400400
4	Pipe temperature sensor assembly	1	202440500004	18	Top cover assembly	1	201237900028
5	Valve plate	1	201237200282	19	Electronic control box assembly	1	203337390156
6	Chassis assembly	1	201237590091	20	Terminal board assembly	1	203337590049
7	Rear right clapboard assembly	1	201237590080	20.1	Wire joint	1	202301400223
8	Big handle	1	201237390104	20.2	Terminal board	1	201237590046
9	Water collector	1	201137400000	21	4-Ways valve assembly	1	201637591341
10	Air outlet grille	1	201137590017	21.1	Gas valve	1	201600720195
12	Front panel	1	201237400392	21.2	4-Ways valve	1	201600690010
13	Axial flow fan	1	201100390002	22	Liquid valve assembly	1	201637490232
14	Asynchronous motor	1	202400370023	22.1	Liquid valve	1	201600740523
15	Supporter assembly of fan motor	1	201237390026	23	Compressor	1	201400620600
16	Partition board assembly	1	201237500213	24	Crankcase electric heater	1	202403100501
16.1	Capacitor of compressor	1	202401000612	25	Discharge temperature sensor	1	202301310068

16.2	Capacitor clip	1	201200100002	35	Electric heater of chassis	1	202403100187

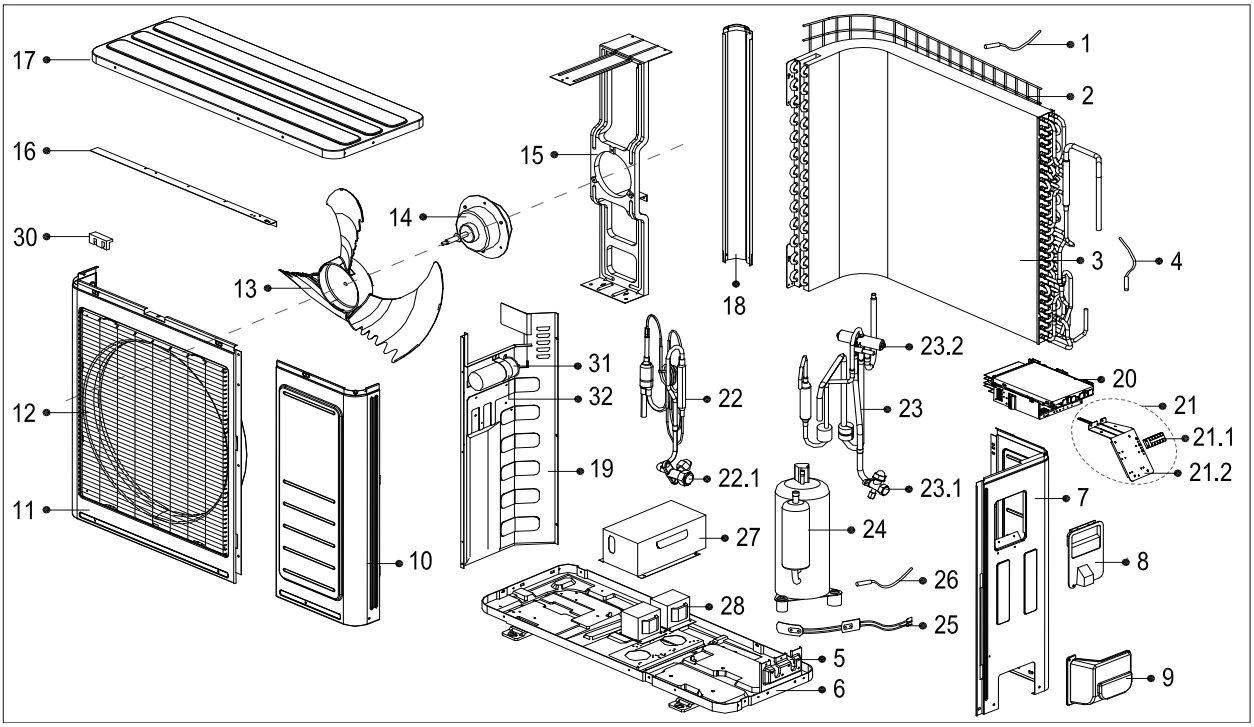
MOC-12HDN1-MQ0W



No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Ambient temperature sensor assembly	1	202440220061	19	Electronic control box assembly	1	203337390153
2	Rear net	1	2011374G0003	20	Terminal board assembly	1	203337590049
3	Condenser assembly	1	201537390033	20.1	Wire joint	1	202301400223
4	Pipe temperature sensor assembly	1	202440500004	20.2	Terminal board	1	201237590046
5	Valve plate	1	201237200282	21	4-Ways valve assembly	1	201637591341
6	Chassis assembly	1	201237590094	21.1	Gas valve	1	201600720195
7	Rear right clapboard assembly	1	201237590080	21.2	4-Ways valve	1	201600690010
8	Big handle	1	201237390104	22	Liquid valve assembly	1	201637590287
9	Water collector	1	201137400000	22.1	Liquid valve	1	201600740523
10	Air outlet grille	1	201137590017	23	Compressor	1	201400620600
12	Front panel	1	201237400392	25	Discharge temperature sensor	1	202301310068
13	Axial flow fan	1	201100320625	26	Cover of inductance	1	201235250802
14	Asynchronous motor	1	202400401345	27	Reactor	1	202301000819
15	Supporter assembly of fan motor	1	201237390016	27	Reactor	1	202301000820
16	Partition board assembly	1	201237590008	29	Capacitor clip	1	201200100005
17	Left supporter	1	201237400400	30	Capacitor of compressor	1	202401000612

18	Top cover assembly	1	201237900028				

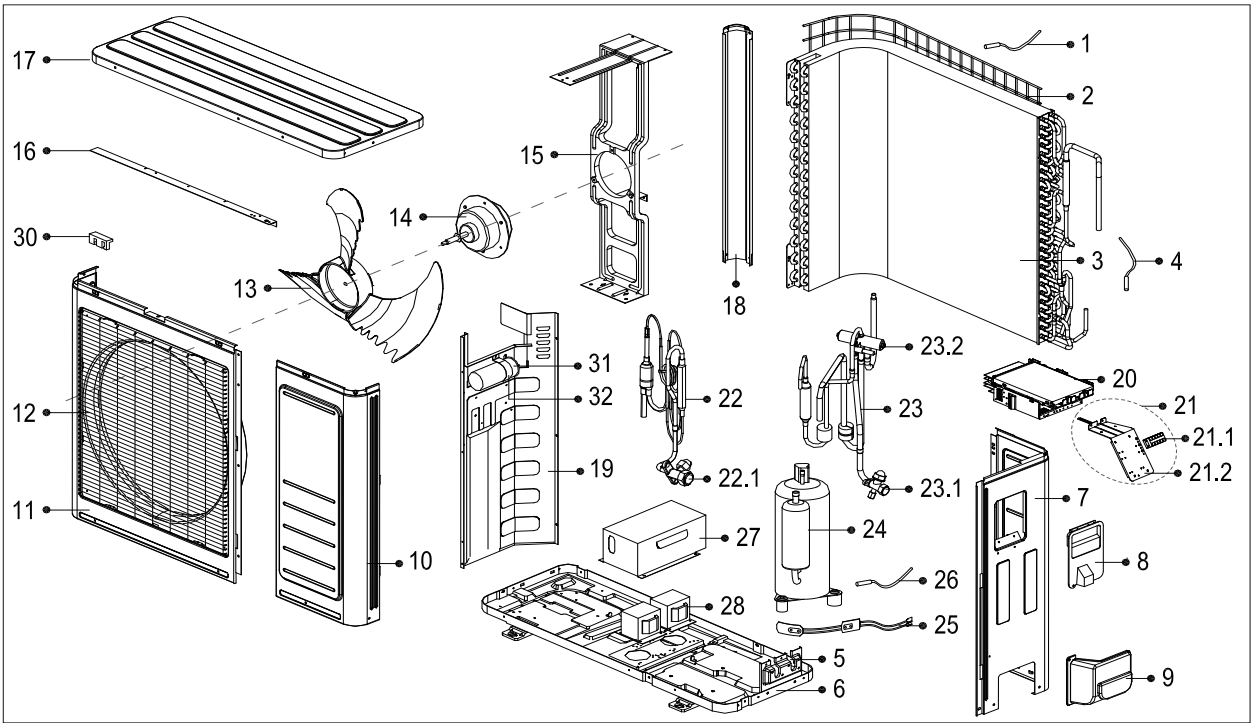
MOC-12HDN1-MQ0W



No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Ambient temperature sensor assembly	1	202301310075	20	Electronic control box assembly	1	203338090138
2	Rear net	1	2011481G0001	21	Terminal board	1	203337990161
3	Condenser assembly	1	201537990036	21.1	Wire joint	1	202301400256
4	Pipe temperature sensor assembly	1	202440500004	21.2	Terminal board	1	201237890064
5	Valve plate	1	201237300285	22	Liquid valve assembly	1	201637790385
6	Chassis assembly	1	201257090054	22.1	Liquid valve	1	201600700078
7	Rear right clapboard assembly	1	201237890100	23	4-way valve assembly	1	201637790384
8	Big handle	1	201237390104	23.1	Gas valve	1	201600720194
9	Water collector	1	201137390017	23.2	4-Ways valve	1	201600690011
10	Front right clapboard assembly	1	201248100389	24	Compressor	1	201400600530
11	Front panel	1	201248100390	25	Crankcase electric heater	1	202403100501
12	Air outlet grille	1	201237890112	26	Discharge temperature sensor	1	202301310068
13	Axial flow fan	1	201145500002	27	Cover of inductance	1	201248090001
14	Asynchronous motor	1	202400400173	28	Reactor	1	202301050026
15	Supporter assembly of fan motor	1	2012481G0039	28	Reactor	1	202301000819
16	Rear supporter	1	201248100384	30	Clamp of front net	8	201135110801
17	Top cover assembly	1	201248100363	31	Capacitor of compressor	1	202401000612

18	Left supporter	1	201248100367	32	Capacitor clip	1	201200100026
19	Partition board assembly	1	201237790031				

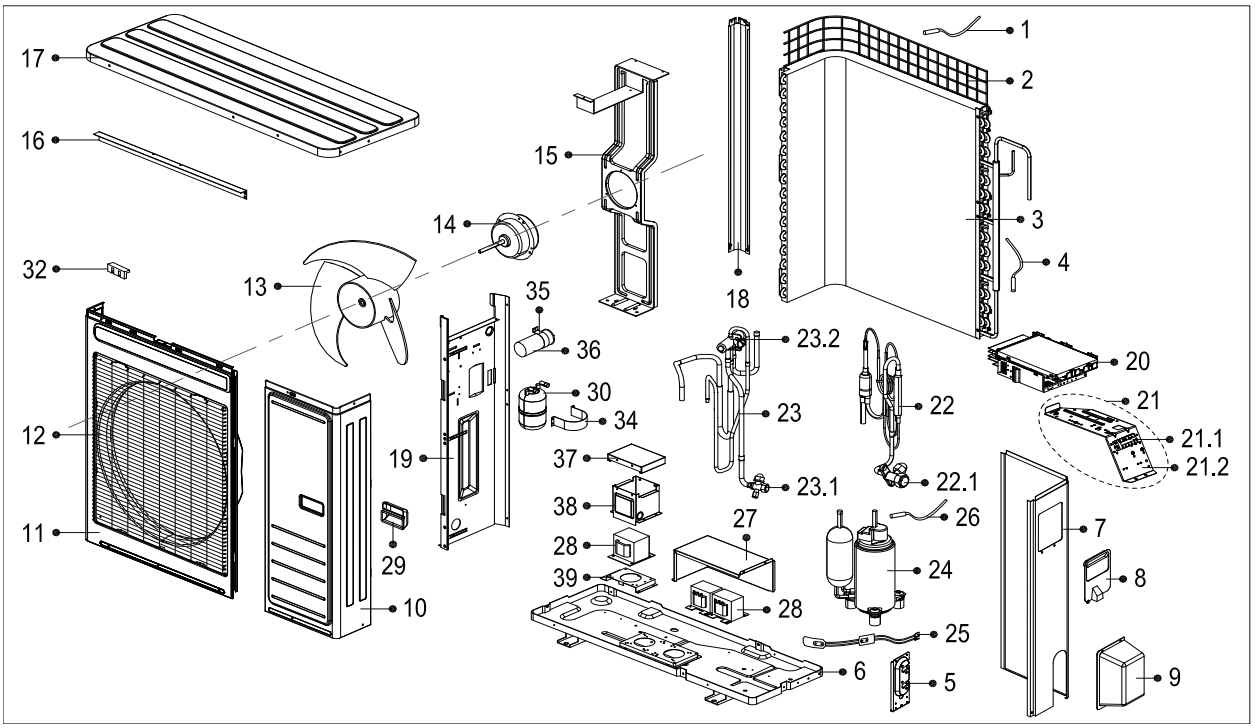
MOF-18HDN1-MQ0W



No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Ambient temperature sensor assembly	1	202301310075	20	Electronic control box assembly	1	203338090138
2	Rear net	1	2011481G0001	21	Terminal board	1	203337990161
3	Condenser assembly	1	201537990036	21.1	Wire joint	1	202301400256
4	Pipe temperature sensor assembly	1	202440500004	21.2	Terminal board	1	201237890064
5	Valve plate	1	201237300285	22	Liquid valve assembly	1	201637790385
6	Chassis assembly	1	201257090054	22.1	Liquid valve	1	201600700078
7	Rear right clapboard assembly	1	201237890100	23	4-way valve assembly	1	201637790384
8	Big handle	1	201237390104	23.1	Gas valve	1	201600720194
9	Water collector	1	201137390017	23.2	4-Ways valve	1	201600690011
10	Front right clapboard assembly	1	201248100389	24	Compressor	1	201400600530
11	Front panel	1	201248100390	25	Crankcase electric heater	1	202403100501
12	Air outlet grille	1	201237890112	26	Discharge temperature sensor	1	202301310068
13	Axial flow fan	1	201145500002	27	Cover of inductance	1	201248090001
14	Asynchronous motor	1	202400400173	28	Reactor	1	202301050026
15	Supporter assembly of fan motor	1	2012481G0039	28	Reactor	1	202301000819
16	Rear supporter	1	201248100384	30	Clamp of front net	8	201135110801
17	Top cover assembly	1	201248100363	31	Capacitor of compressor	1	202401000612

18	Left supporter	1	201248100367	32	Capacitor clip	1	201200100026
19	Partition board assembly	1	201237790031				

MOG-24HDN1-MQOW

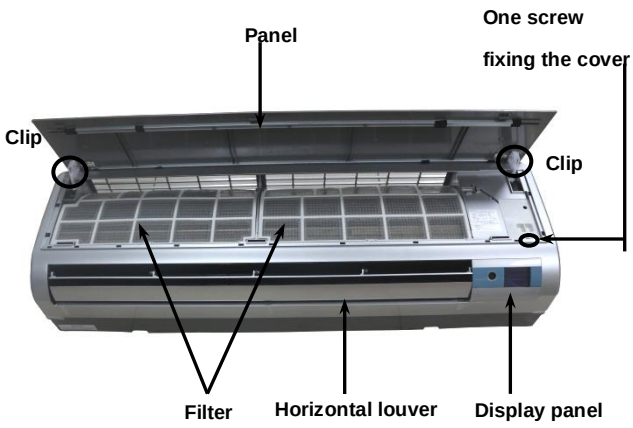
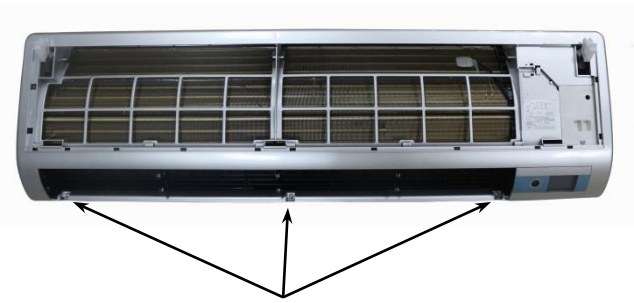


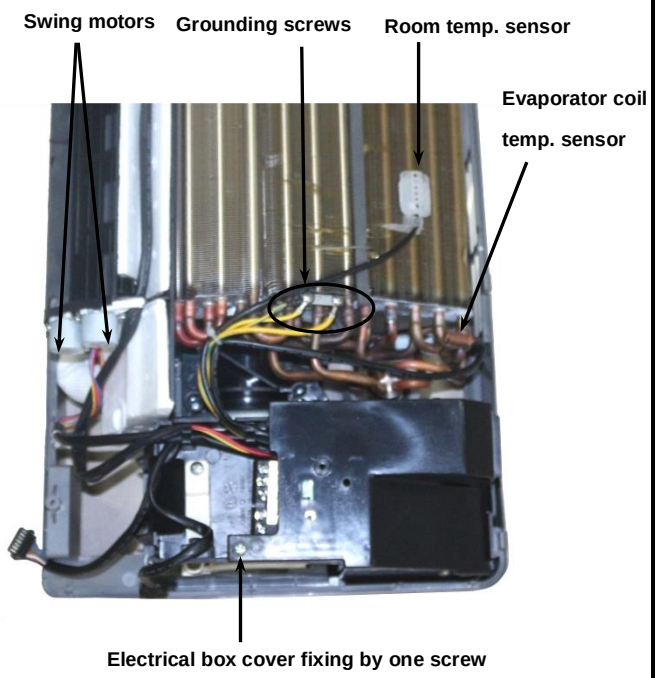
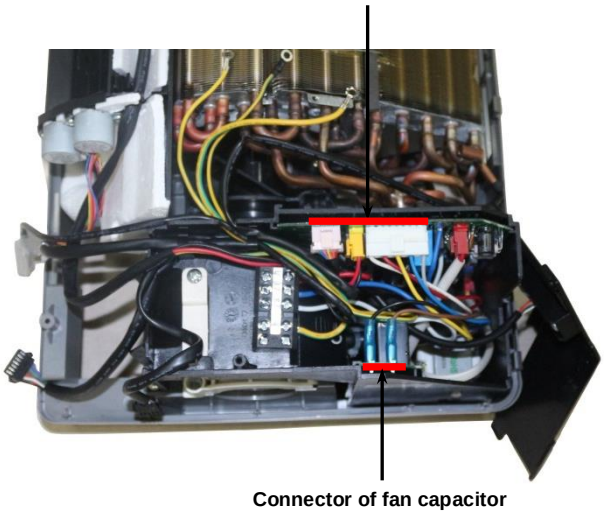
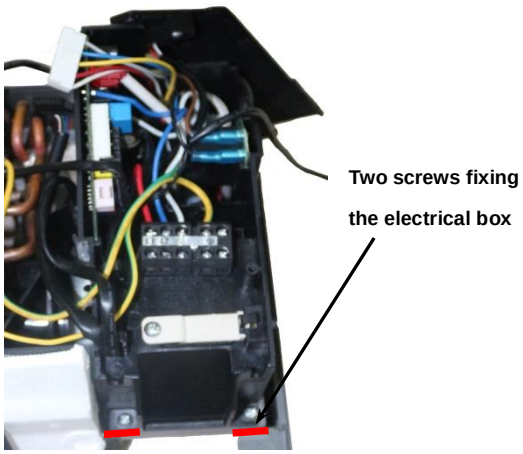
No.	Part Name	Qty	BOM Code	No.	Part Name	Qty	BOM Code
1	Ambient temperature sensor assembly	1	202301310075	21.2	Terminal board	1	201238090032
2	Rear net	1	2011482G0001	22	Liquid valve assembly	1	201638091089
3	Condenser assembly	1	201538090038	22.1	Liquid valve	1	201600740706
4	Pipe temperature sensor assembly	1	202301300111	23	Gas valve assembly	1	201638090251
5	Valve plate	1	201248300316	23.1	Gas valve	1	201600720398
6	Chassis assembly	1	201238090064	23.2	4-Ways valve	1	201600600119
7	Rear right clapboard assembly	1	201238090067	24	Compressor	1	201400600530
8	Big handle	1	201237390104	25	Crankcase electric heater	1	202403100501
9	Water collector	1	201138090002	26	Discharge temperature sensor	1	202301310068
10	Front right clapboard assembly	1	201248200082	27	Cover of inductance	1	201248390003
11	Front panel	1	201248200144	28	Reactor	1	202301050026
12	Air outlet grille	1	201237890112	28	Reactor	1	202301040055
13	Axial flow fan	1	201100300202	28	Reactor	1	202301000819
14	Asynchronous motor	1	202400410666	29	Small Handle	2	201148700009
15	Supporter assembly of fan motor	1	201238090007	30	Accumulator cylinder	1	201638090129
16	Rear supporter	1	201248200095	32	Clamp for front net	8	201135110801

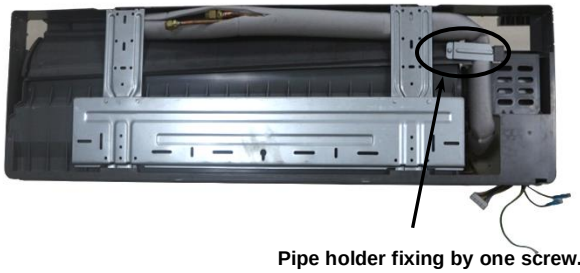
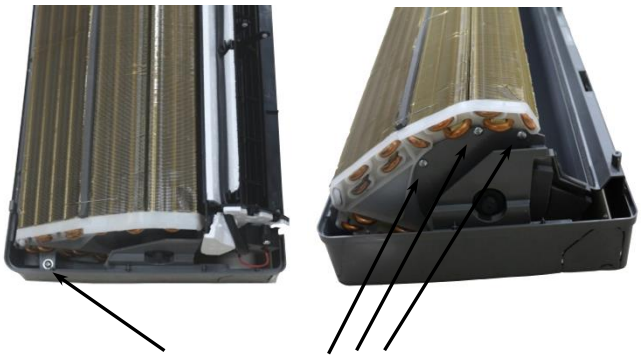
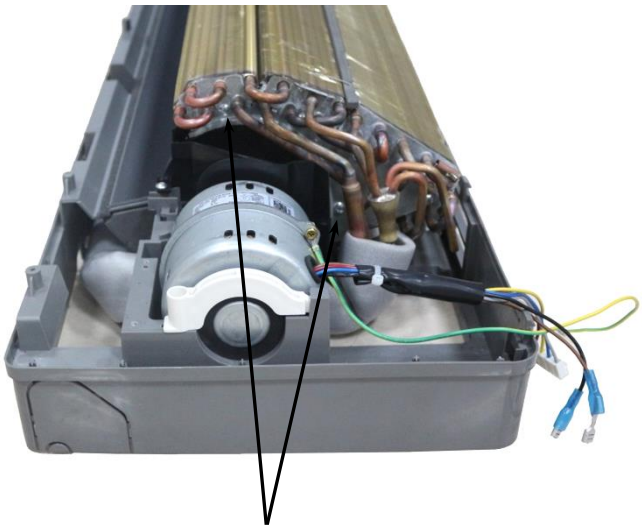
17	Top cover assembly	1	201248300309	34	Fix clamp of segregator	1	201245000901
18	Left supporter	1	201248400036	35	Capacitor clip	1	201200100026
19	Partition board sembly	1	201238090004	36	Capacitor of compressor	1	202401000612
20	Electronic control box assembly	1	203338090134	37	Inductance cover	1	201238090037
21	Terminal board assembly	1	203338090187	38	Protecting board of inductance	1	201238090038
21.1	Wire joint	1	202301450118	39	Inductance holder	1	201250200305

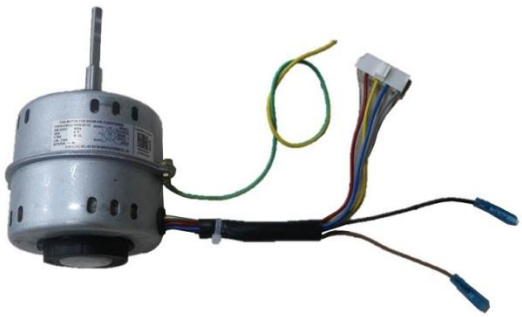
12 Disassembly Instructions

12.1 Indoor unit

No.	Parts name	Procedures	Remarks
1	Front panel	How to remove the front panel. 1) Pull the below side of the panel and release the clips. Then remove the front panel. 2) Remove the filter and horizontal louver. 3) Remove the three fixing screws. 4) Remove the cover (one screw). 5) Lift the panel frame and release the two connectors. One is for the display board ass'y. The other is for the switch board. Then remove the panel frame assembly.	**Overview:**    

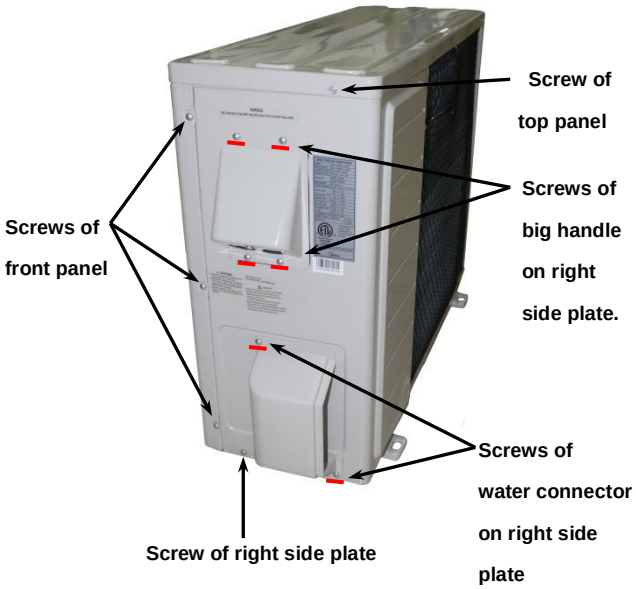
2	Electrical parts	How to remove the electrical parts. 1) After remove the front panel from procedure 1, pull out the room temp. sensor and evaporator coil sensor. Remove the grounding screws. 2) Remove the fixing screw and open the electrical box cover. . 3) Pull out the connectors of the swing motor, ionizer, fan motor and the capacitor . 4) Remove the two fixing screws and then remove the electronic control box and air outlet ass'y.	  

3	Evaporator	How to remove the evaporator. 1) After remove the front panel ass'y and electrical parts following procedure 1 and procedure 2, remove the pipe holder at the rear side of the unit. 2) Remove the four screws on the evaporator at the base bearing side. 3) Remove two screws on the evaporator at the fixed plates and then lift the evaporator ass'y.	 **Pipe holder fixing by one screw.**  **Four screws at the base bearing side**  **Two screws at the fixed plates**

4	Fan and motor	How to remove the fan and motor. 1) After remove the evaporator ass'y following procedure 1, procedure 2 and procedure 3, remove the five screws. 2) Then separate the fan and motor.	 **Five screws**  

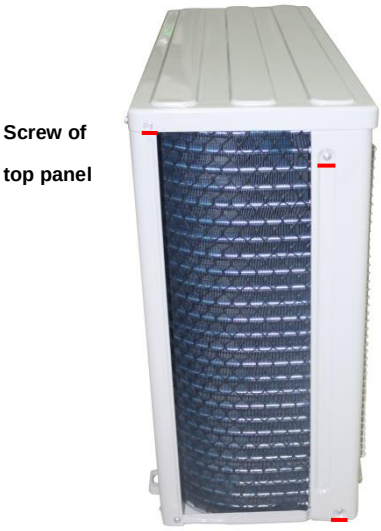
12.2 Outdoor unit

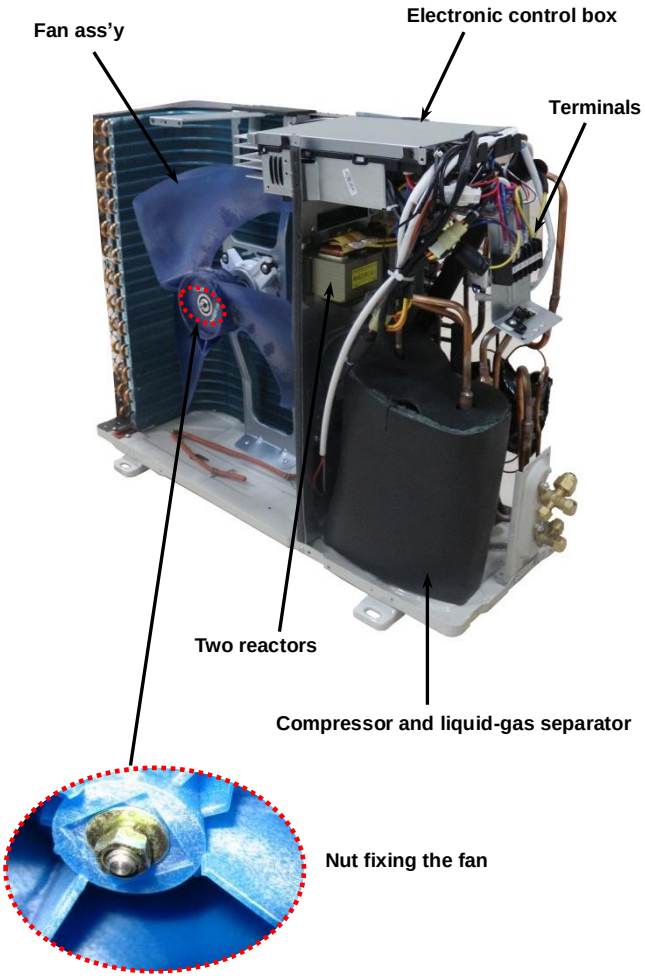
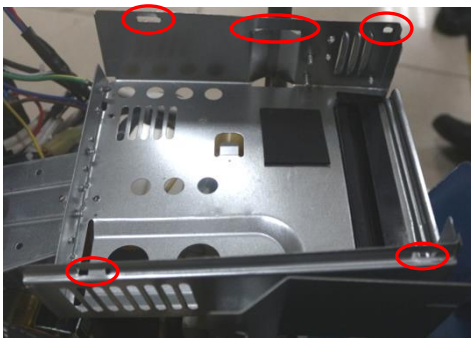
➢ **MOC-09HFN1-MTOW, MOC-12HFN1-MTOW**

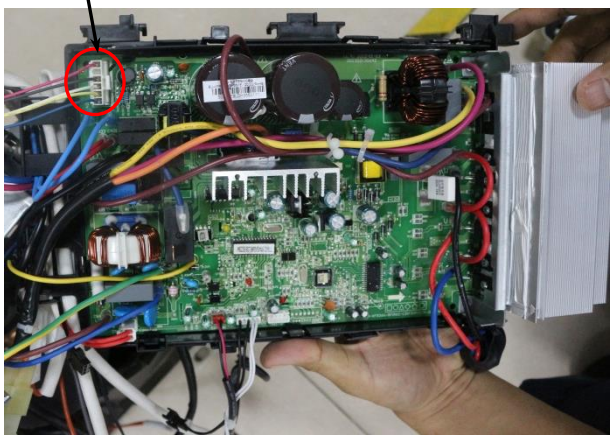
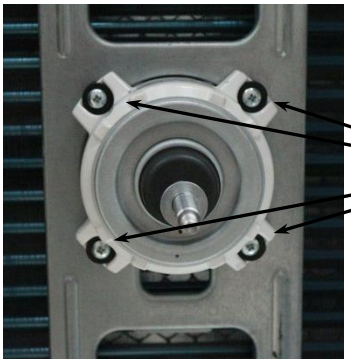
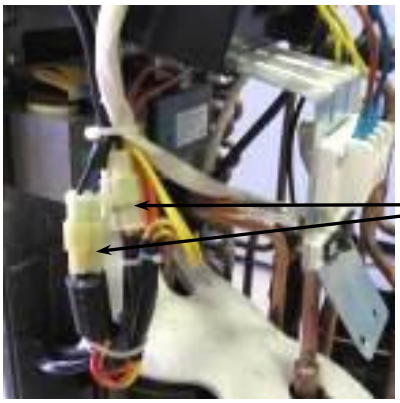
No.	Part name	Procedures	Remarks
1	Panel plate	How to remove the panel plate. 1) Stop operation of the air conditioner and turn "OFF" the power breaker. 2) Refer to the right side photos, find out the fixing screws of the panels. 3) Remove the screws of top panel and remove the top panel.	 

4) Remove the screws of the front panel, including the fixing screws of motor holder and then remove the front panel.

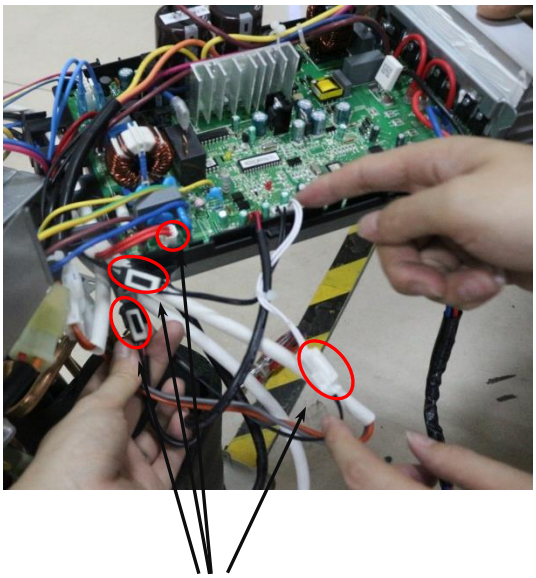
5) Remove the screws of the right side plate and remove the right side plate.



2	Fan ass'y	How to remove the fan ass'y. 1) After remove the panel plate following procedure 1, remove the hex nut fixing the fan and then remove the fan. 2) Unfix the hooks and then open the electronic control box cover.	  

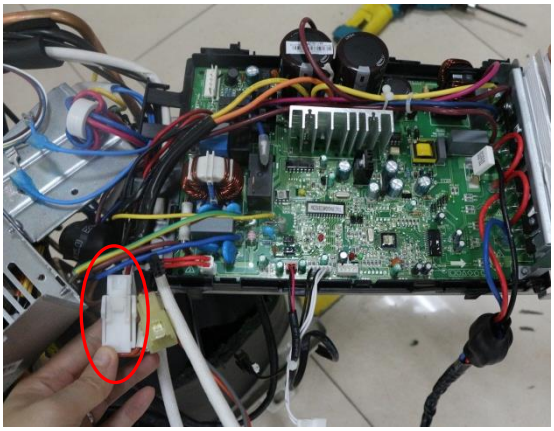
		3) Disconnect the connector for fan motor from the electronic control board. 4) Remove the four fixing screws of the fan motor. 5) Then remove the fan motor.	Fan motor connector   Four screws
3	Electrical parts	How to remove the electrical parts. 1) After finish work of item 1 and item 2, remove the two connectors for the compressor and the reactors. 2) Pull out the two blue wires connected with the four way valve.	 Two connectors  Two blue wires of four way valve.

3) Pull out connectors of the compressor top temp. sensor, condenser coil temp. sensor(T3),outdoor ambient temp. sensor(T4) and discharge temp. sensor(T5).

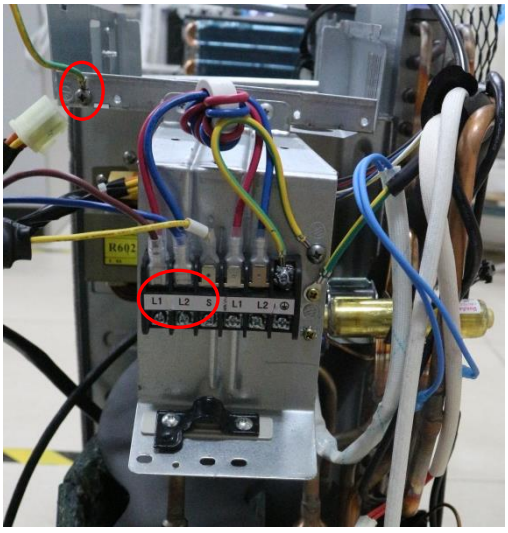


Four temp. sensor connectors

4) Disconnect the compressor crankcase heater connector.

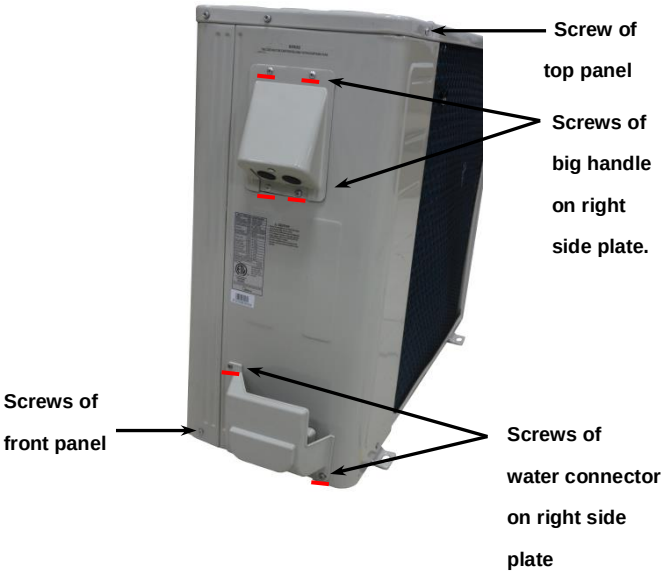


5) Remove the ground wires .
6) Remove the power supply wires(L1,L2,S).
7) Then remove the electronic control box.



4	Four-way valve	How to remove the four-way valve. 1) Perform work of item 1,2,3. 2) Recover refrigerant from the refrigerant circuit. 3) Remove the screw of the coil and then remove the coil. 4) Detach the welded parts of four-way valve and pipe. 5) Then the four-way valve ass'y can be removed	The picture of four-way valve may be different from the one on your side. 
5	Compressor	How to remove the compressor. 1) After perform work of item1,2,3. 2) Remove the discharge pipe and suction pipe with a burner. 3) Remove the hex nuts and washers fixing the compressor on bottom plate. 4) Lift the compressor from the base pan assembly.	

➢ **MOF-18HDN1-MQ0W**

No.	Part name	Procedures	Remarks
	Panel plate	How to remove the panel plate. 1) Stop operation of the air conditioner and turn "OFF" the power breaker. 2) Refer to the right side photos, find out the fixing screws of the panels. 3) Remove the screws of top panel and remove the top panel.	 

4) Remove the screws of the front panel, including the fixing screws of motor holder and then remove the front panel.

Screw of the top panel

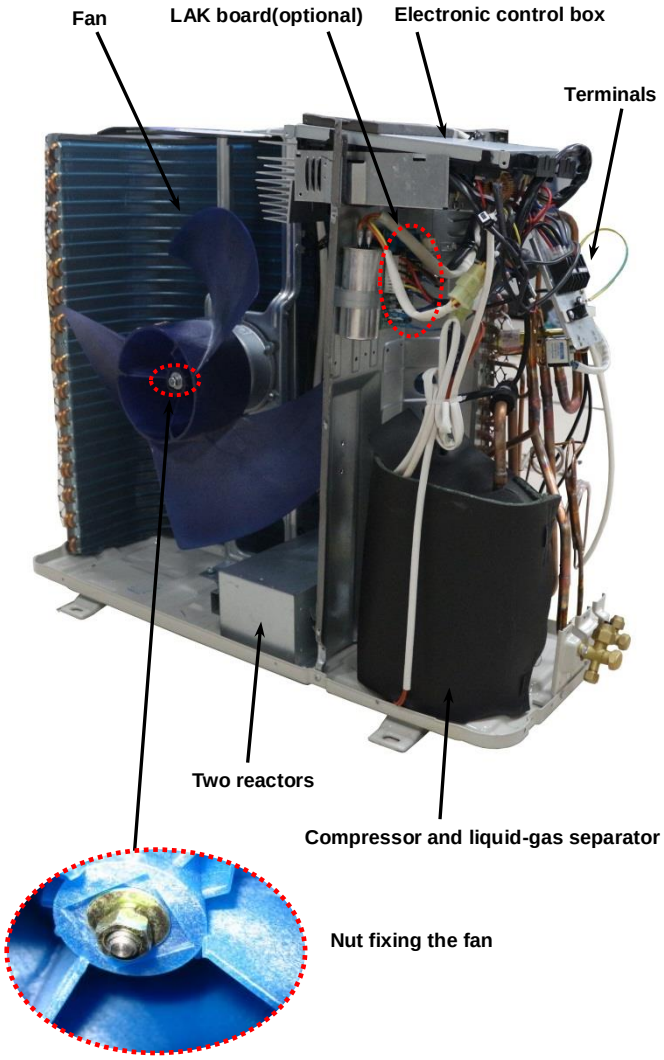
Screws of right rear plate

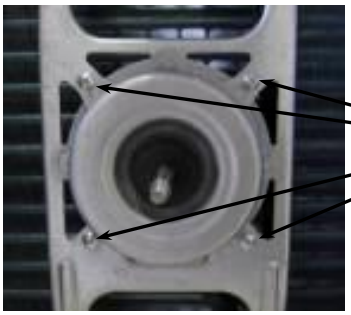
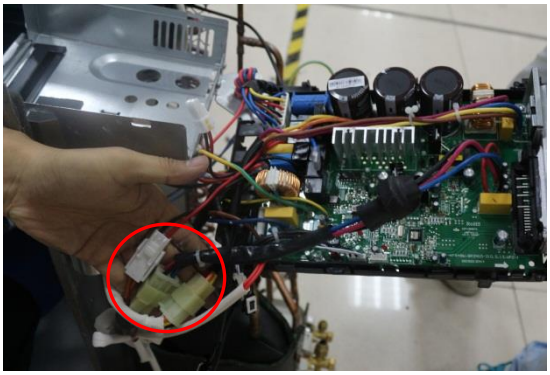
5) Remove the screws of the right side plate and remove the right side plate.

Screw of top panel

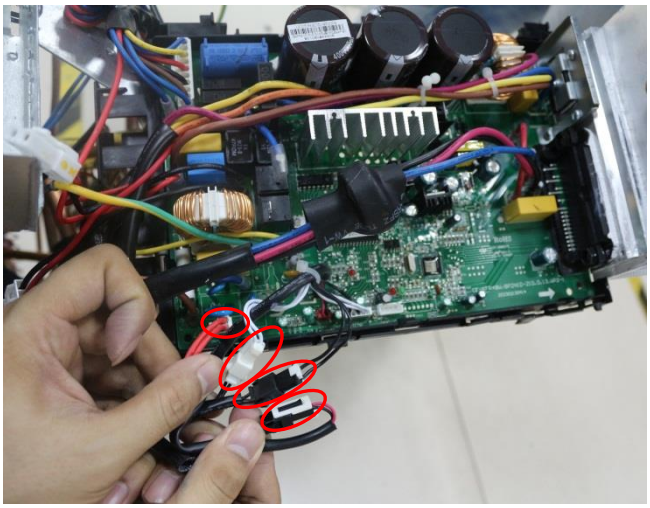
Screws of front panel

Screws of the motor holder

2	Fan ass'y	How to remove the fan ass'y. 1) After remove the panel plate following procedure 1, remove the hex nut fixing the fan and then remove the fan. 2) Unfix the hooks and then open the electronic control box cover.	 

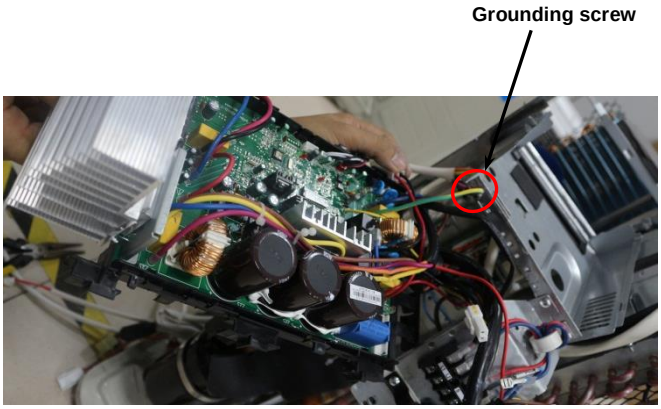
		3) Disconnect the connector for fan motor from the electronic control board. 4) Remove the four fixing screws of the fan motor. 5) Then remove the fan motor.	 Fan motor connector  Four screws
3	Electrical parts	How to remove the electrical parts. 1) After finish work of item 1 and item 2, remove the three connectors for the compressor and the reactors and the compressor crankcase heater. 2) Pull out the two blue wires connected with the four way valve.	 Two blue wires of four way valve. 

3) Pull out connectors of the compressor top temp. sensor, condenser coil temp. sensor(T3),outdoor ambient temp. sensor(T4) and discharge temp. sensor(T5).

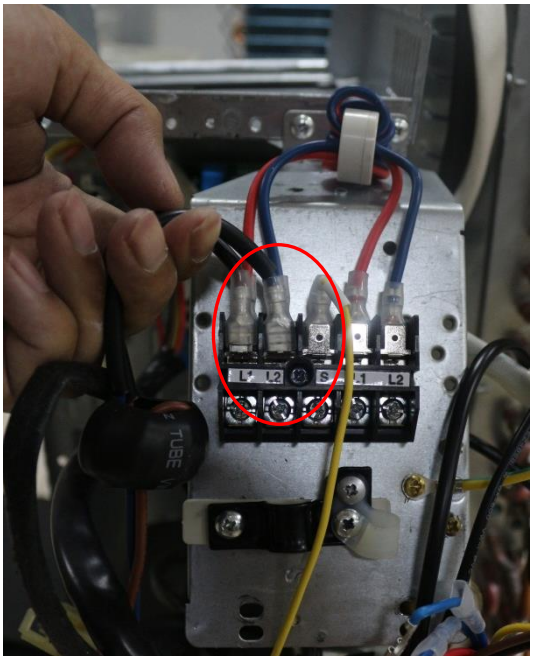


Four temp. sensor connectors

4) Remove the grounding screw.



5) Remove the power supply wires(L1,L2,S).
6) Then remove the electronic control box.



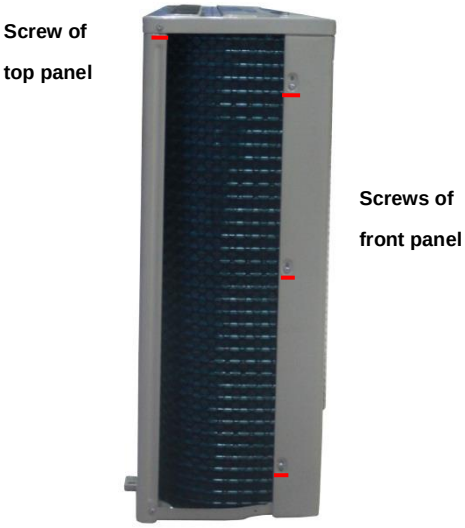
4	Four-way valve	How to remove the four-way valve. 1) Perform work of item1,2,3. 2) Recover refrigerant from the refrigerant circuit. 3) Remove the screw of the coil and then remove the coil. 4) Detach the welded parts of four-way valve and pipe. 5) Then the four-way valve ass'y can be removed	The picture of four-way valve may be different from the one on your side. 
5	Compressor	How to remove the compressor. 1) After perform work of item1,2,3. 2) Remove the discharge pipe and suction pipe with a burner. 3) Remove the hex nuts and washers fixing the compressor on bottom plate. 4) Lift the compressor from the base pan assembly.	

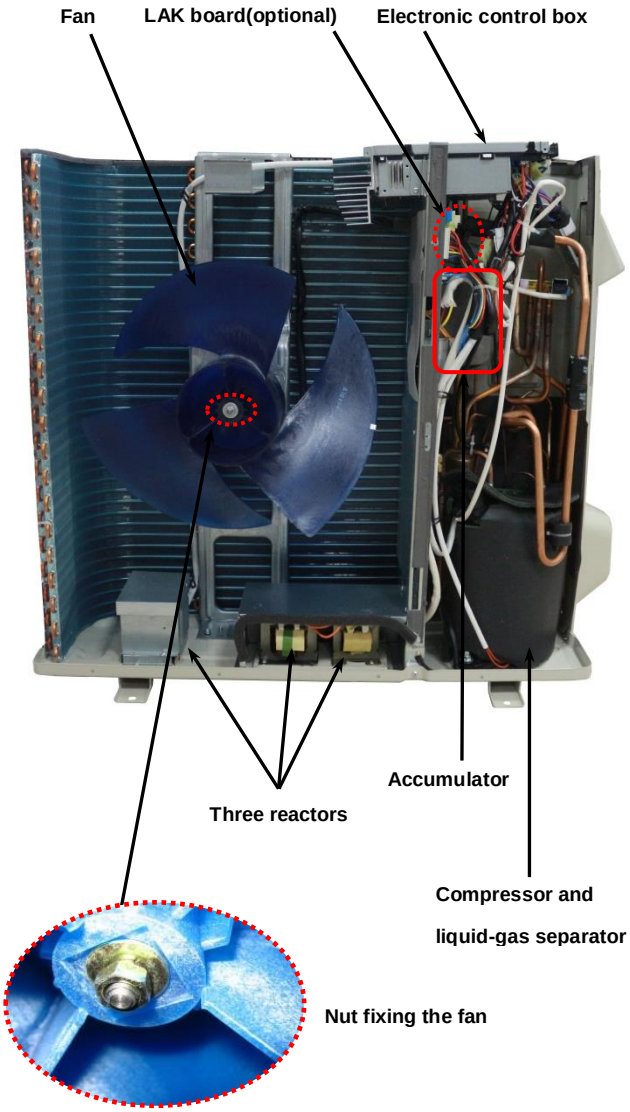
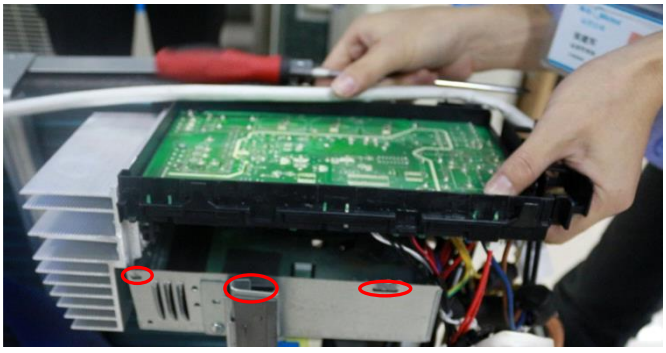
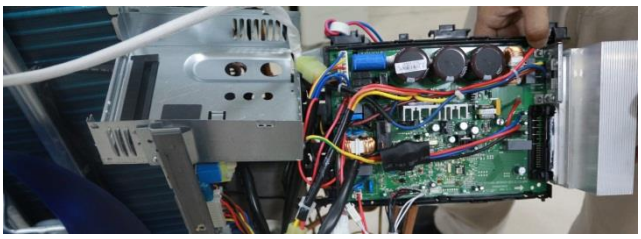
➢ **MOG-24HDN1-MQOW**

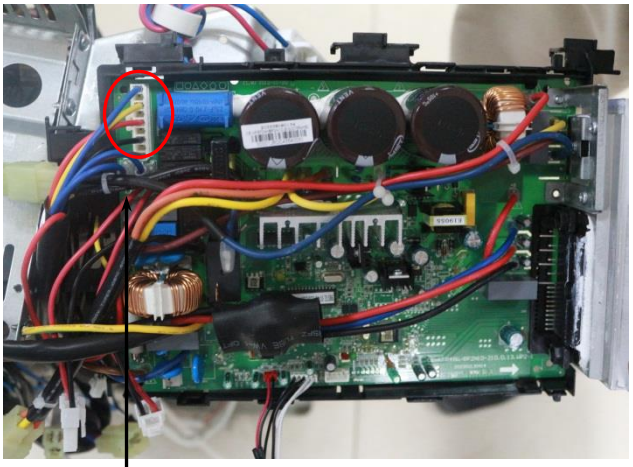
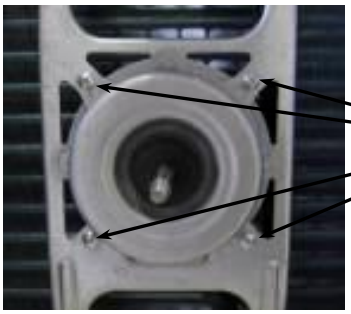
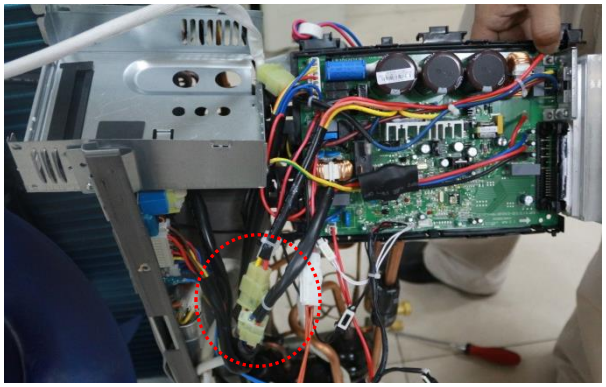
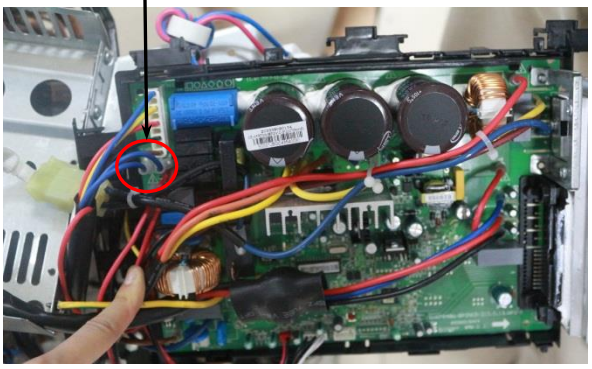
No.	Part name	Procedures	Remarks
	Panel plate	How to remove the panel plate. 1) Stop operation of the air conditioner and turn "OFF" the power breaker. 2) Refer to the right side photos, find out the fixing screws of the panels. 3) Remove the screws of top panel and remove the top panel.	 

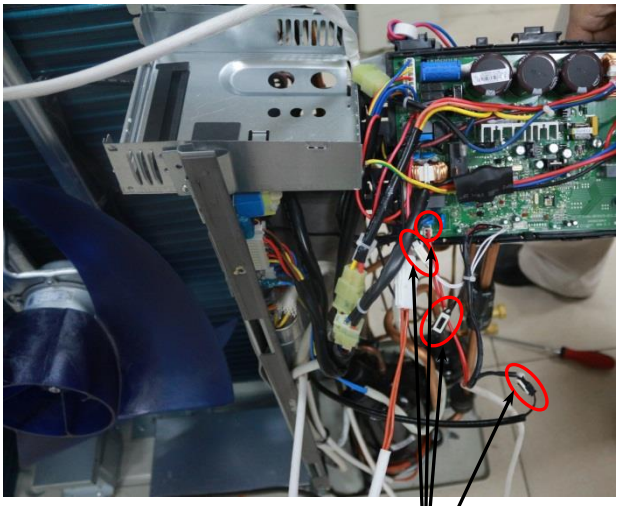
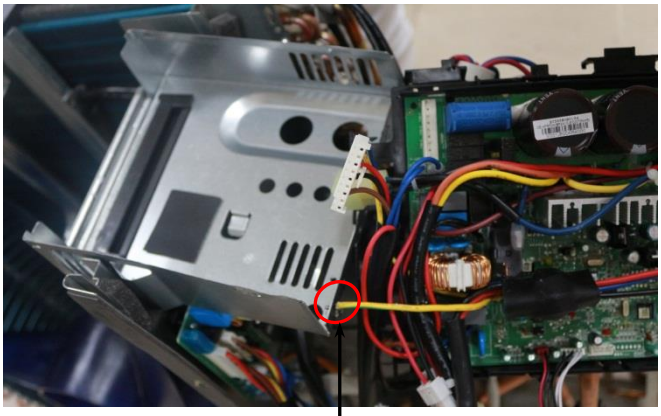
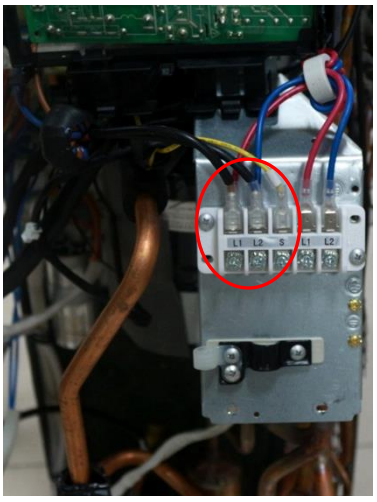
4) Remove the screws of the front panel, including the fixing screws of motor holder and then remove the front panel.

5) Remove the screws of the right side plate and remove the right side plate.



2	Fan ass'y	How to remove the fan ass'y. 1) After remove the panel plate following procedure 1, remove the hex nut fixing the fan and then remove the fan. 2) Unfix the hooks and then open the electronic control box cover.	  

		3) Disconnect the connector for fan motor from the electronic control board. 4) Remove the four fixing screws of the fan motor. 5) Then remove the fan motor.	 Fan motor connector  Four screws
3	Electrical parts	How to remove the electrical parts. 1) After finish work of item 1 and item 2, remove the three connectors for the compressor and the reactors and the compressor crankcase heater. 2) Pull out the two blue wires connected with the four way valve.	 Two blue wires of four way valve 

		3) Pull out connectors of the compressor top temp. sensor, condenser coil temp. sensor(T3),outdoor ambient temp. sensor(T4) and discharge temp. sensor(T5).	 **Four temp. sensor connectors**
		4) Remove the grounding screw.	 **Grounding screw**
		5) Remove the power supply wires(L1,L2,S). 6) Then remove the electronic control box.	

4	Four-way valve	How to remove the four-way valve. 1) Perform work of item1,2,3. 2) Recover refrigerant from the refrigerant circuit. 3) Remove the screw of the coil and then remove the coil. 4) Detach the welded parts of four-way valve and pipe. 5) Then the four-way valve ass'y can be removed	The picture of four-way valve may be different from the one on your side. 
5	Compressor	How to remove the compressor. 1) After perform work of item1,2,3. 2) Remove the discharge pipe and suction pipe with a burner. 3) Remove the hex nuts and washers fixing the compressor on bottom plate. 4) Lift the compressor from the base pan assembly.