

Service Instructions

Split System Wall Mounted Air Conditioners and Heat Pumps with R-410A Refrigerant



15 SEER



19 SEER

This manual is to be used by qualified, professionally trained HVAC technicians only. Goodman does not assume any responsibility for property damage or personal injury due to improper service procedures or services performed by an unqualified person.

Goodman Manufacturing Company, L.P.
5151 San Felipe, Suite 500
Houston, TX 77056
www.goodmanmfg.com

RS6100006r4
March 2014

Copyright © 2011 - 2014 Goodman Manufacturing Company, L.P.

TABLE OF CONTENTS

IMPORTANT INFORMATION	2 - 4	SPECIFICATIONS	14 - 21
NOMENCLATURE	5	REMOTE CONTROL	22 - 25
PRODUCT FEATURES	7	SERVICE	26 - 46
PRODUCT DESIGN	8 - 12	TROUBLESHOOTING	47 - 59
SYSTEM OPERATION	13	WIRING DIAGRAMS	60 - 77

IMPORTANT INFORMATION

Pride and workmanship go into every product to provide our customers with quality products. It is possible, however, that during its lifetime a product may require service. Products should be serviced only by a qualified service technician who is familiar with the safety procedures required in the repair and who is equipped with the proper tools, parts, testing instruments and the appropriate service manual. **REVIEW ALL SERVICE INFORMATION IN THE APPROPRIATE SERVICE MANUAL BEFORE BEGINNING REPAIRS.**

IMPORTANT NOTICES FOR CONSUMERS AND SERVICERS

RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS



WARNING

This unit should not be connected to, or used in conjunction with, any devices that are not design certified for use with this unit or have not been tested and approved by Goodman. Serious property damage or personal injury, reduced unit performance and/or hazardous conditions may result from the use of devices that have not been approved or certified by Goodman.



WARNING

Installation and repair of this unit should be performed ONLY by individuals meeting (at a minimum) the requirements of an "Entry Level Technician" as specified by the Air Conditioning, Heating, and Refrigeration Institute (AHRI). Attempting to install or repair this unit without such background may result in product damage, personal injury, or death.



WARNING

To prevent the risk of property damage, personal injury, or death, do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this appliance.



WARNING

Goodman will not be responsible for any injury or property damage arising from improper service or service procedures. If you perform service on your own product, you assume responsibility for any personal injury or property damage which may result.

To locate an authorized servicer, please consult your telephone book or the dealer from whom you purchased this product. For further assistance, please contact:

CONSUMER INFORMATION LINE
GOODMAN® BRAND PRODUCTS
TOLL FREE 1-877-254-4729 (U.S. only)
email us at: customerservice@goodmanmfg.com
fax us at: (713) 856-1821
(Not a technical assistance line for dealers.)

Outside the U.S., call 1-713-861-2500. (Not a technical assistance line for dealers.) Your telephone company will bill you for the call.

Outside the U.S., call 1-931-433-6101. (Not a technical assistance line for dealers.) Your telephone company will bill you for the call.

IMPORTANT INFORMATION

SAFE REFRIGERANT HANDLING

While these items will not cover every conceivable situation, they should serve as a useful guide.



WARNING

Refrigerants are heavier than air. They can "push out" the oxygen in your lungs or in any enclosed space. To avoid possible difficulty in breathing or death:

- Never purge refrigerant into an enclosed room or space. By law, all refrigerants must be reclaimed.
- If an indoor leak is suspected, thoroughly ventilate the area before beginning work.
- Liquid refrigerant can be very cold. To avoid possible frostbite or blindness, avoid contact with refrigerant and wear gloves and goggles. If liquid refrigerant does contact your skin or eyes, seek medical help immediately.
- Always follow EPA regulations. Never burn refrigerant, as poisonous gas will be produced.



WARNING

To avoid possible explosion:

- Never apply flame or steam to a refrigerant cylinder. If you must heat a cylinder for faster charging, partially immerse it in warm water.
- Never fill a cylinder more than 80% full of liquid refrigerant.
- Never add anything other than R-22 to an R-22 cylinder or R-410A to an R-410A cylinder. The service equipment used must be listed or certified for the type of refrigerant used.
- Store cylinders in a cool, dry place. Never use a cylinder as a platform or a roller.



WARNING

HIGH VOLTAGE

Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.



WARNING

To avoid possible injury, explosion or death, practice safe handling of refrigerants.



WARNING

To avoid possible explosion, use only returnable (not disposable) service cylinders when removing refrigerant from a system.

- Ensure the cylinder is free of damage which could lead to a leak or explosion.
- Ensure the hydrostatic test date does not exceed 5 years.
- Ensure the pressure rating meets or exceeds 400 lbs.

When in doubt, do not use cylinder.



WARNING

System contaminants, improper service procedure and/or physical abuse affecting hermetic compressor electrical terminals may cause dangerous system venting.

The successful development of hermetically sealed refrigeration compressors has completely sealed the compressor's moving parts and electric motor inside a common housing, minimizing refrigerant leaks and the hazards sometimes associated with moving belts, pulleys or couplings.

Fundamental to the design of hermetic compressors is a method whereby electrical current is transmitted to the compressor motor through terminal conductors which pass through the compressor housing wall. These terminals are sealed in a dielectric material which insulates them from the housing and maintains the pressure tight integrity of the hermetic compressor. The terminals and their dielectric embedment are strongly constructed, but are vulnerable to careless compressor installation or maintenance procedures and equally vulnerable to internal electrical short circuits caused by excessive system contaminants.

In either of these instances, an electrical short between the terminal and the compressor housing may result in the loss of integrity between the terminal and its dielectric embedment. This loss may cause the terminals to be expelled, thereby venting the vaporous and liquid contents of the compressor housing and system.

A venting compressor terminal normally presents no danger to anyone, providing the terminal protective cover is properly in place.

If, however, the terminal protective cover is not properly in place, a venting terminal may discharge a combination of

- (a) hot lubricating oil and refrigerant
- (b) flammable mixture (if system is contaminated with air)

in a stream of spray which may be dangerous to anyone in the vicinity. Death or serious bodily injury could occur.

Under no circumstances is a hermetic compressor to be electrically energized and/or operated without having the terminal protective cover properly in place.

IMPORTANT INFORMATION

Please read and follow the important notes below before using.



WARNING

HIGH VOLTAGE

Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.



CAUTION

Hazards or unsafe practices may result in property damage, product damage, personal injury or death.

Installation:

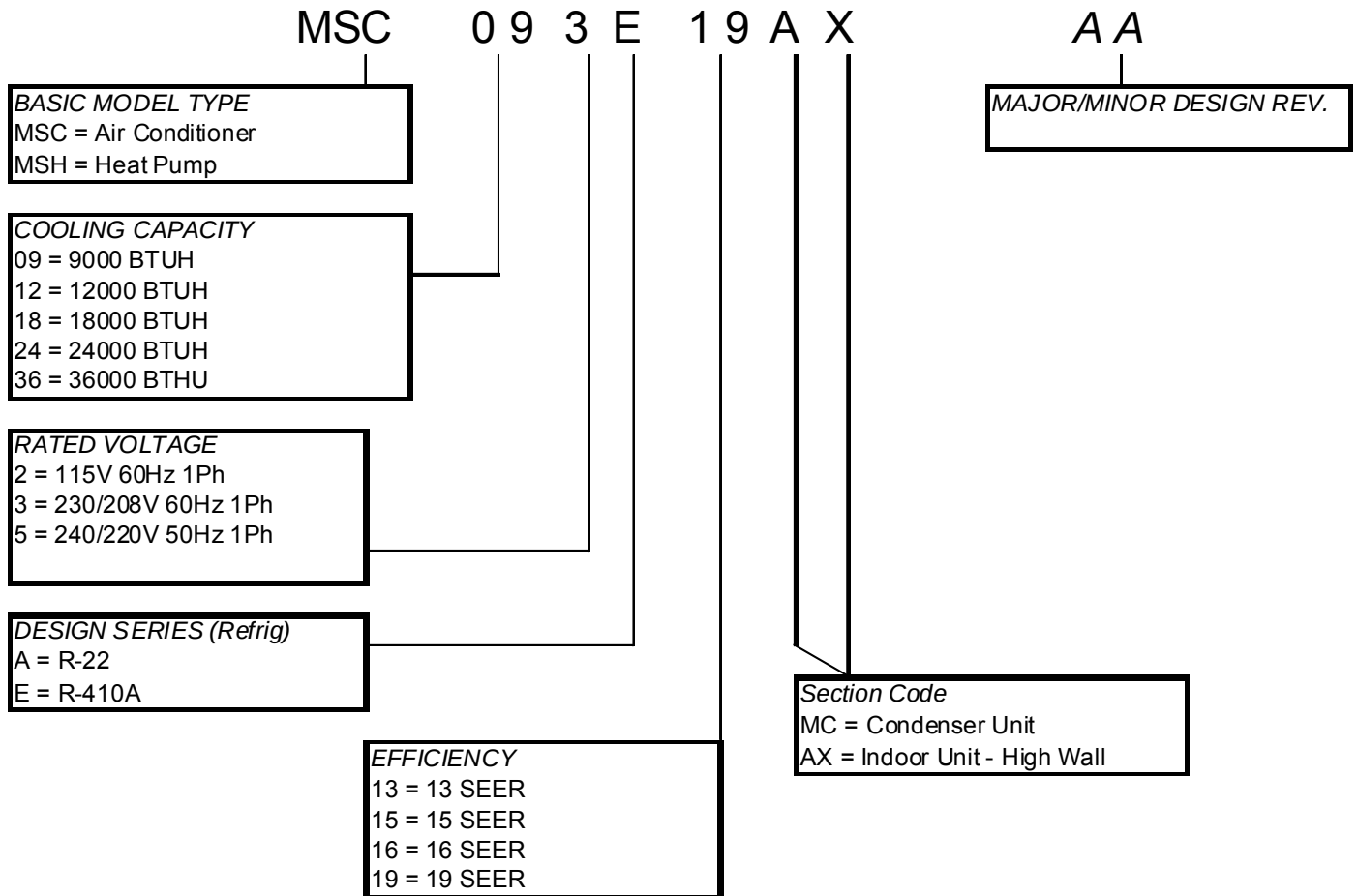
1. Always use the correct size circuit breaker and fuse. Circuit breakers should be installed on a dedicated circuit.
2. Properly ground the unit.
3. Do NOT use extension cords.
4. Ensure that the unit is mounted on a stable installation stand. Check periodically for signs of deterioration.
5. Running the unit for long periods of time during high humidity or with windows/doors open may cause condensation on furnishings.
6. The power cable should not be stretched and nothing should sit on it. Always turn the unit off before plugging or unplugging the power cable.
7. Make sure proper ventilation of conditioned space is provided.
8. Protect unit before arrival of inclement weather.
9. Do not open the inlet grill during operation of the unit.
10. Do not touch the electrostatic filter if unit is equipped with one.
11. If smoke or unusual noises emit from the unit, immediately turn off the unit and disconnect ALL power. (See warning above.)
12. Do not allow water to enter the unit. In the instance that the unit is soaked or submerged, contact an authorized servicer.
13. When the unit is not used for a long period of time, disconnect ALL power to the unit.
14. Place the outdoor unit in a location away from high traffic areas to prevent tripping or damage to the unit. Do not place objects on the unit.
15. Always install the panel and the cover of the control box securely.
16. Do not store gas or flammable liquids near the unit.

1. Always check for refrigerant leakage after installation or repair of the product.
2. Drain hose must be installed properly so water will drain away from the unit.
3. Installing the unit in an unlevel position may cause vibration or water leakage.
4. Install the outdoor unit away from vegetation as tall vegetation may cause air re-circulation, which will reduce efficiency and damage the unit; and the hot air may cause damage to vegetation in close proximity.
5. To avoid personal injury, always use two people to lift or transport the unit.
6. Unit should not be installed where it may be exposed directly to sea coast conditions (sea wind or salt spray).
7. To avoid the risk of personal injury, wiring to the unit must be properly polarized and grounded.
8. Use care when unpacking and installing the unit. There are sharp edges on the unit. The use of gloves is recommended when unpacking.

Operation:

1. Do not block the inlet or outlet of airflow.
2. Do not use harsh detergents, solvents, etc., to clean the unit. A soft cloth is recommended.
3. Use caution when removing the air filter, as there may be sharp, metal edges.
4. Clean the filter every two weeks or more often if necessary, and be sure to seat the filter securely when installing.
5. Keep hands and foreign objects away from the air outlets while the unit is in operation.
6. When the unit is not used for a prolonged period of time, disconnect all power to the unit.

NOMENCLATURE



MODEL LIST

15 SEER

Model	Description	Voltage
MSC092E15AX	Mini-Split Indoor Section	9kBTU 115V 60 Hz
MSC092E15MC	Mini-Split Condenser	9kBTU 115V 60 Hz
MSC123E15AX	Mini-Split Indoor Section	12kBTU 230V 60 Hz
MSC123E15MC	Mini-Split Condenser	12kBTU 230V 60 Hz
MSC183E15AX	Mini-Split Indoor Section	18kBTU 230V 60 Hz
MSC183E15MC	Mini-Split Condenser	18kBTU 230V 60 Hz
MSC243E15AX	Mini-Split Indoor Section	25kBTU 230V 60 Hz
MSC243E15MC	Mini-Split Condenser	25kBTU 230V 60 Hz

Model	Description	Voltage
MSH092E15AX	Mini-Split Indoor Section Heat Pump	9kBTU 115V 60 Hz
MSH092E15MC	Mini-Split Condenser Heat Pump	9kBTU 115V 60 Hz
MSH123E15AX	Mini-Split Indoor Section Heat Pump	12kBTU 230V 60 Hz
MSH123E15MC	Mini-Split Condenser Heat Pump	12kBTU 230V 60 Hz
MSH183E15AX	Mini-Split Indoor Section Heat Pump	18kBTU 230V 60 Hz
MSH183E15MC	Mini-Split Condenser Heat Pump	18kBTU 230V 60 Hz
MSH243E15AX	Mini-Split Indoor Section Heat Pump	24kBTU 230V 60 Hz
MSH243E15MC	Mini-Split Condenser Heat Pump	24kBTU 230V 60 Hz

19 SEER

Model	Description	Voltage
MSC092E19AX	Mini-Split Indoor Section	9kBTU 115V 60 Hz
MSC092E19MC	Mini-Split Condenser	9kBTU 115V 60 Hz
MSC122E19AX	Mini-Split Indoor Section	12kBTU 115V 60 Hz
MSC122E19MC	Mini-Split Condenser	12kBTU 115V 60 Hz
MSC123E19AX	Mini-Split Indoor Section	12kBTU 230V 60 Hz
MSC123E19MC	Mini-Split Condenser	12kBTU 230V 60 Hz
MSC183E19AX	Mini-Split Indoor Section	18kBTU 230V 60 Hz
MSC183E19MC	Mini-Split Condenser	18kBTU 230V 60 Hz
MSC243E19AX	Mini-Split Indoor Section	25kBTU 230V 60 Hz
MSC243E19MC	Mini-Split Condenser	25kBTU 230V 60 Hz

Model	Description	Voltage
MSH092E19AX	Mini-Split Indoor Section Heat Pump	9kBTU 115V 60 Hz
MSH092E19MC	Mini-Split Condenser Heat Pump	9kBTU 115V 60 Hz
MSH122E19AX	Mini-Split Indoor Section Heat Pump	12kBTU 115V 60 Hz
MSH122E19MC	Mini-Split Condenser Heat Pump	12kBTU 115V 60 Hz
MSH123E19AX	Mini-Split Indoor Section Heat Pump	12kBTU 230V 60 Hz
MSH123E19MC	Mini-Split Condenser Heat Pump	12kBTU 230V 60 Hz
MSH183E19AX	Mini-Split Indoor Section Heat Pump	18kBTU 230V 60 Hz
MSH183E19MC	Mini-Split Condenser Heat Pump	18kBTU 230V 60 Hz
MSH243E19AX	Mini-Split Indoor Section Heat Pump	24kBTU 230V 60 Hz
MSH243E19MC	Mini-Split Condenser Heat Pump	24kBTU 230V 60 Hz

PRODUCT FEATURES

15 SEER

Indoor unit:

1. **Remote control operation.**
2. **Turbo.** Using this button on the remote control causes the unit to ramp up into a more powerful cooling or heating operation.
3. **Auto Re-Start Function.** Remembers your last, current settings and automatically applies them after a power outage.
4. **Sleep Mode.** The unit can be set in either cooling or heating mode in a 7-hour cycle to maximize your comfort level.
5. **LCD Display.**
6. **Auto Level Swing.**
7. **Louver Angle Position Memory.** Within pre-set boundaries, this function memorizes the open angle of the horizontal louver.
10. **Cold Catalyst Filter .** This washable filter is easy to remove, wash and is easy to maintain.
11. **Timer.** The unit can be set to turn on and off (in a 24 hour period) to allow you to maintain the ideal, most cost efficient temperature.
12. **Refrigerant Leakage Detection.** Indoor unit will alarm when refrigerant is not enough.

Outdoor unit:

1. **Power relay control** The unit has a 3 minute delay between continuously ON/OFF operations.
2. **Low noise design.** The outdoor unit is designed to minimize noise when in operation.
3. **Hydrophilic aluminum fin.** Applies to cooling & heating modes only. The fin improves the heating efficiency at operation mode.
4. **4-way valve control.** Only operates in the heating operation mode, except when in defrost operation.
5. **Anti-rust cabinet.** Crafted from hot galvanized steel sheet metal and anti-rust coated components.
6. **Valve protection cover.** Cover protects the valves and prevents water from dripping.
7. **Refrigerant Leakage Detection.** If a refrigerant leak is detected by the outdoor unit, EC will appear on the display panel and the indicator lights will flash.
8. **Low Ambient Kit.** Allows your unit to operate in air conditioning mode, even when the outdoor temperature is cold.

19 SEER

Indoor unit:

1. **Remote control operation.**
2. **Anti-freezing control in cooling mode.** Prevents water from being frozen on the evaporator by checking the evaporator pipe temperature.
3. **Time delay safety control.**
4. **Indoor fan speed control.** Turbo, high, medium, low and breeze.
5. **Two-direction air vane.** The unit automatically adjust the louver direction according to the mode of operation.
6. **Sleep mode auto control.**
7. **Independent dehumidification.** Used primarily for high humidity conditions/damp areas.
8. **Airflow direction.** Louver can be manually set at desire position or set to automatically swing up or down.
9. **Auto Mode.** Unit automatically adjusts to room temperature.
10. **Temperature compensation.**
11. **Current protection.**
12. **Self-diagnosing function.**

13. **Anti-cold function.** Prevents cold air burst at the beginning of the unit start up.
14. **Defrost mode.**
15. **Auto re-start.**
16. **Flexible wiring connection.**

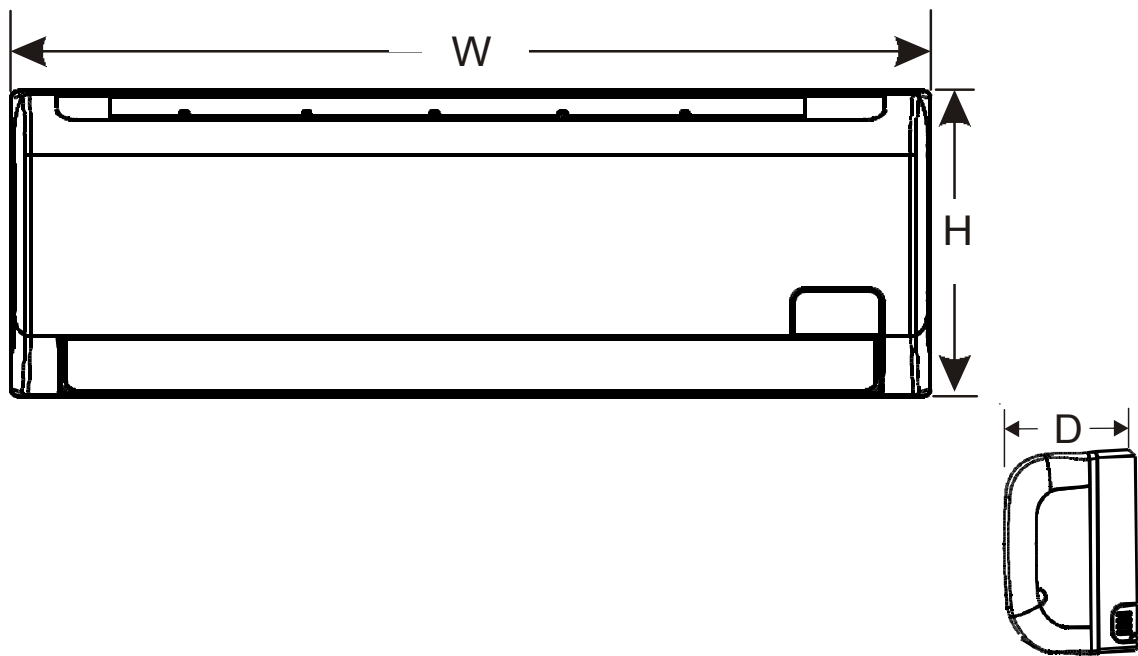
Outdoor unit:

1. **Power relay control** The unit has a 3 minute delay between continuously ON/OFF operations.
2. **Low noise airflow system.** Bird tail propeller fan makes the outdoor unit run more quietly.
3. **Hydrophilic aluminum fin.** Applies to cooling & heating modes only. The fin improves the heating efficiency at operation mode.
4. **4-way valve control.** Only operates in the heating operation mode, except when in defrost operation.
5. **Anti-rust cabinet.** Crafted from electrolytic zinc steel sheet metal and anti-rust coated components.
6. **Valve protection cover.** Cover protects the valves and prevents water from dripping.

PRODUCT DESIGN

15 SEER & 19 SEER

DIMENSIONS - INDOOR UNIT



15 SEER

Model	Width	Height	Depth
MSC092E15AX	26 3/4" 680mm	7" 178mm	10" 255mm
MSC123E15AX	30 1/4" 770mm	7 3/8" 188mm	10" 255mm
MSC183E15AX	35 5/8" 905mm	7 3/4" 198mm	10 7/8" 275mm
MSC243E15AX	40 1/2" 1030mm	8 5/8" 218mm	12 3/8" 315mm

Dimensions in inches & mm

19 SEER

Model	Width	Height	Depth
MSC092E19AX MSH092E19AX MS*122E 19AX MS*123E 19AX	36" 920mm	11 1/2" 292mm	8 3/4" 223mm
MS*183E 19AX	39" 998mm	12 1/2" 322mm	9 1/2" 240mm
MS*243E 19AX	56 7/8" 1445mm	13 3/8" 340mm	10 7/8" 277mm

Dimensions in inches & mm

15 SEER

Diagram illustrating the installation of the indoor unit. The unit is shown with dimensions: 5" (120mm) or more to wall on both sides, and 6" (150mm) or more to ceiling. The unit is labeled "Indoor unit outline". The diagram also shows the "Left rear side refrigerant pipe hole $\phi 65$ " and "Right rear side refrigerant pipe hole $\phi 65$ ". The unit is connected to the outdoor unit via a refrigerant pipe labeled "A".

Diagram illustrating the required clearances for the indoor unit of a 12,000 Btu/h split system. The unit is shown with dimensions A, B, C, and D. Clearances are specified for the ceiling, wall, and rear side refrigerant pipe holes.

Clearances:

- Upward clearance: 6" (150mm) or more to ceiling
- Left side clearance: 5" (120mm) or more to wall
- Right side clearance: 5" (120mm) or more to wall
- Left rear side refrigerant pipe hole $\phi 65$
- Right rear side refrigerant pipe hole $\phi 65$

Dimensions:

- A: 30" (770mm)
- B: 10" (255mm)
- C: 6.5" (170mm)
- D: 4" (95mm)

Diagram showing the installation dimensions for the indoor unit of a 18,000 Btu/h split system. The unit is shown with two mounting brackets. Dimensions include:

- 6" (150mm) or more to ceiling
- 5" (120mm) or more to wall
- 18,000 Btu/h (A: 36" (905mm), B: 11" (275mm), C: 3" (80mm), D: 4" (100mm))
- Left rear side refrigerant pipe hole $\phi 65$
- Right rear side refrigerant pipe hole $\phi 65$
- Mounting Bracket
- Indoor unit outline
- C
- D
- 2" (48mm)
- 2" (48mm)
- B
- A

Indoor unit outline

6" (150mm) or more to ceiling

11.5" (293mm)

Installation plate

6.4" (163mm)

5" (120mm) or more to wall

8" (21.5mm)

12.4" (315mm)

1.75" (45mm)

40.5" (1030mm)

Left rear side refrigerant pipe hole $\phi 65$

Right rear side refrigerant pipe hole $\phi 65$

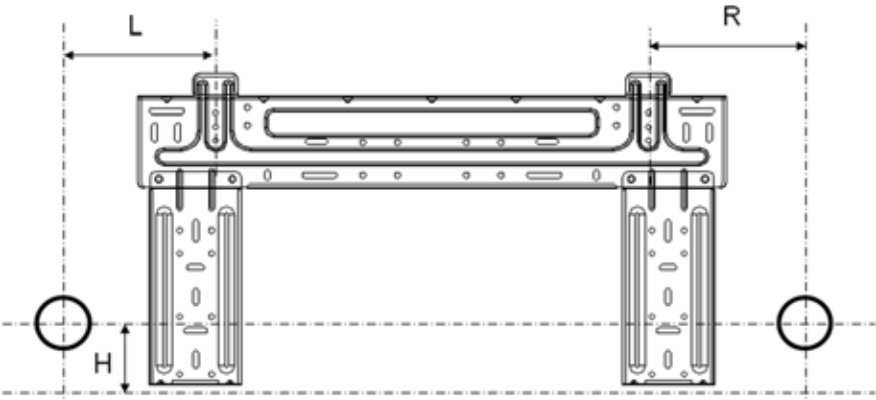
5" (120mm) or more to wall

PRODUCT DESIGN

19 SEER

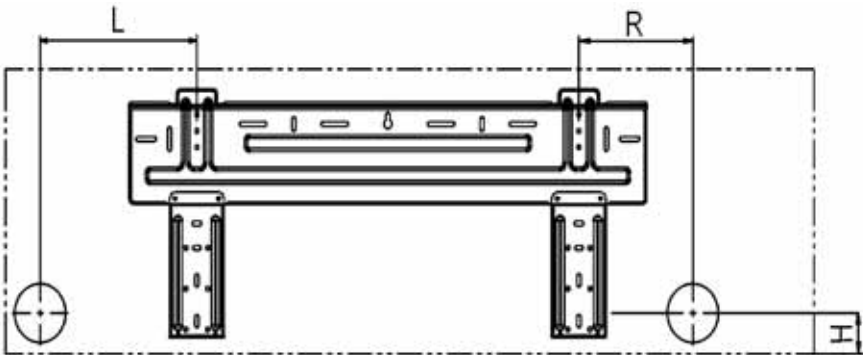
DIMENSIONS - INDOOR UNIT (9,000-18,000)

9k & 12k



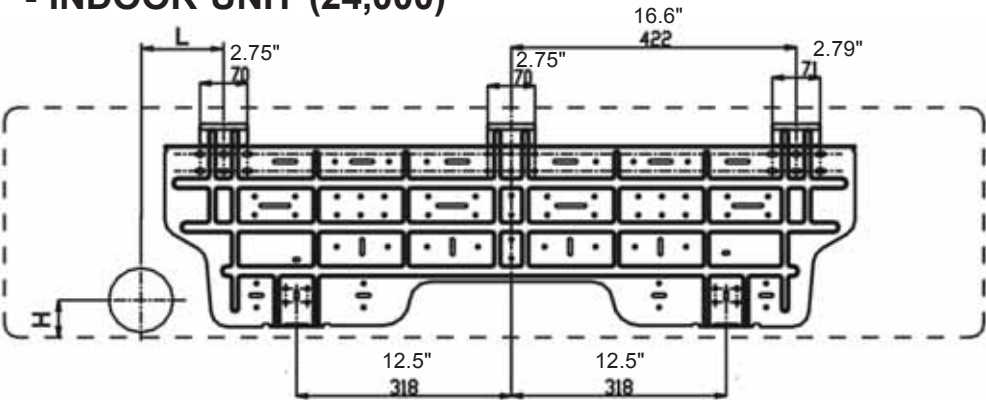
L Inch (mm)	R Inch (mm)	H Inch (mm)	Dimension of installation hole (mm)
5.9 (150)	7.3 (187)	1.75 (45)	2.55 (φ65)

18k



L Inch (mm)	R Inch (mm)	H Inch (mm)	Dimension of installation hole (mm)
3.9 (100)	4.6 (119)	1.75 (45)	2.55 (φ65)

DIMENSIONS - INDOOR UNIT (24,000)

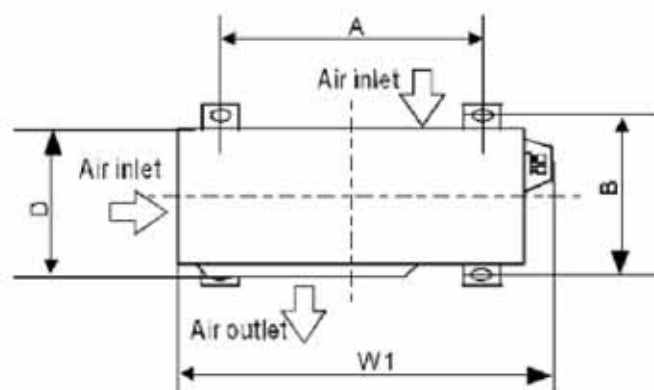
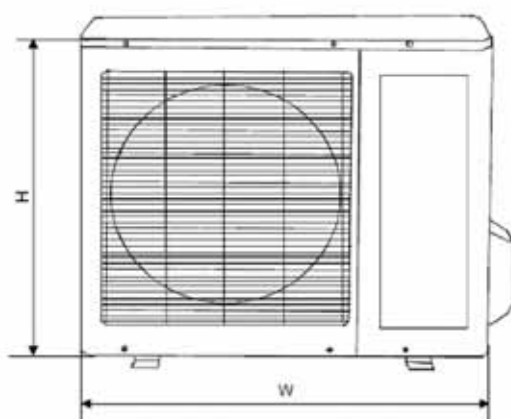
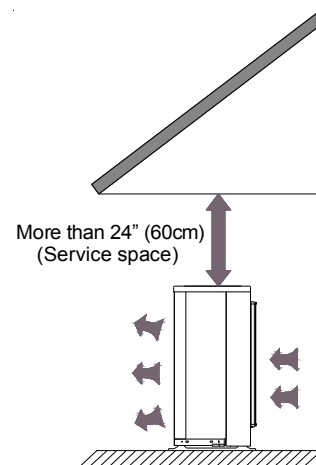
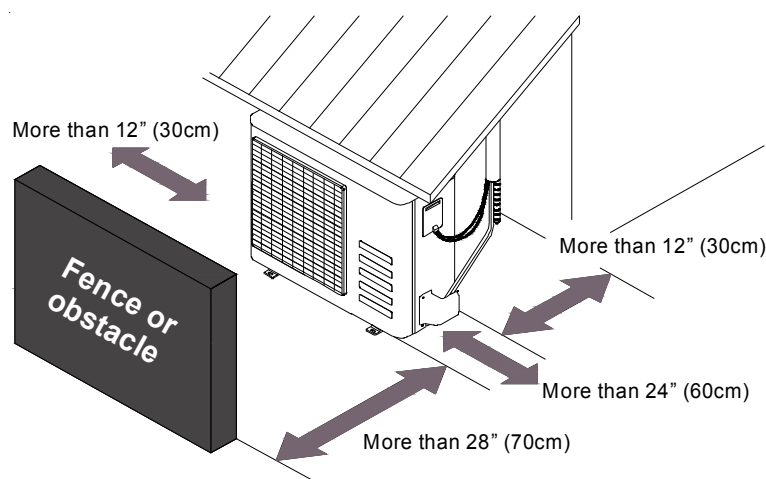


L Inch (mm)	H Inch (mm)	Dimension of installation hole (mm)
4.7 (120.50)	2.2 (55)	2.55 (φ65)

PRODUCT DESIGN

15 SEER

DIMENSIONS - OUTDOOR UNIT



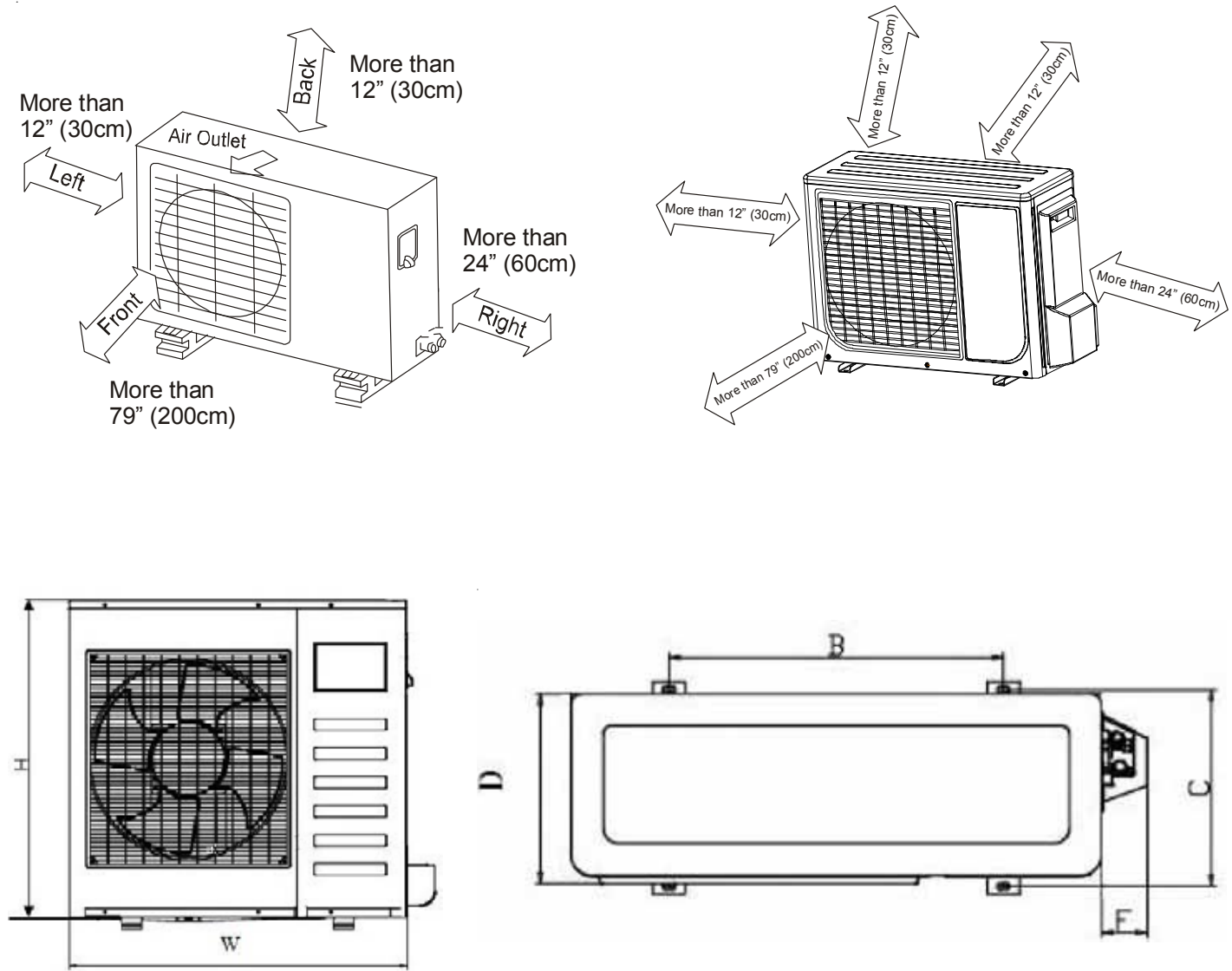
Model	W	H	D	W1	A	B
MSC092E15AX MSC092E15MC MSH092E15AX MSH092E15MC	26" 660mm	10 2/5" 265mm	21 1/4" 540mm	28 4/5" 732mm	18" 458mm	10 4/5" 276mm
MSC123E15AX MSC123E15AX MSH123E15MC MSH123E15MC	30 3/4" 780mm	9 4/5" 250mm	21 1/4" 540mm	33 1/5" 843mm	21 3/5" 549mm	10 4/5" 276mm
MSC183E15AX MSC183E15AX MSH183E15MC MSH183E15MC	30" 760mm	11" 285mm	23" 590mm	32 2/5" 823mm	20 4/5" 530mm	11" 290mm
MSC243E15AX MSC243E15AX MSH243E15MC MSH243E15MC	33" 845mm	12 1/2" 320mm	27 1/2" 700mm	35 3/4" 908mm	22" 560mm	13" 335mm

Dimensions in inches & millimeters.

PRODUCT DESIGN

19 SEER

DIMENSIONS - OUTDOOR UNIT



Model	W	H	D	B	C	F
MS*092E19MC	30"	23"	11"	21"	11"	2 1/2"
MS*122E19MC	760mm	590mm	285mm	530mm	290mm	63mm
MS*123E19MC						
MS*183E19MC	33"	27 1/2"	12 1/2"	22"	13"	2 1/2"
	845mm	700mm	320mm	560mm	335mm	63mm
MS*243E19MC	35"	12"	33 1/2"	38 1/2"	23"	13"
	900mm	315mm	860mm	980mm	590mm	333mm

Dimensions in inches / mm

SYSTEM OPERATION

15 SEER & 19 SEER

OPERATION LIMITS

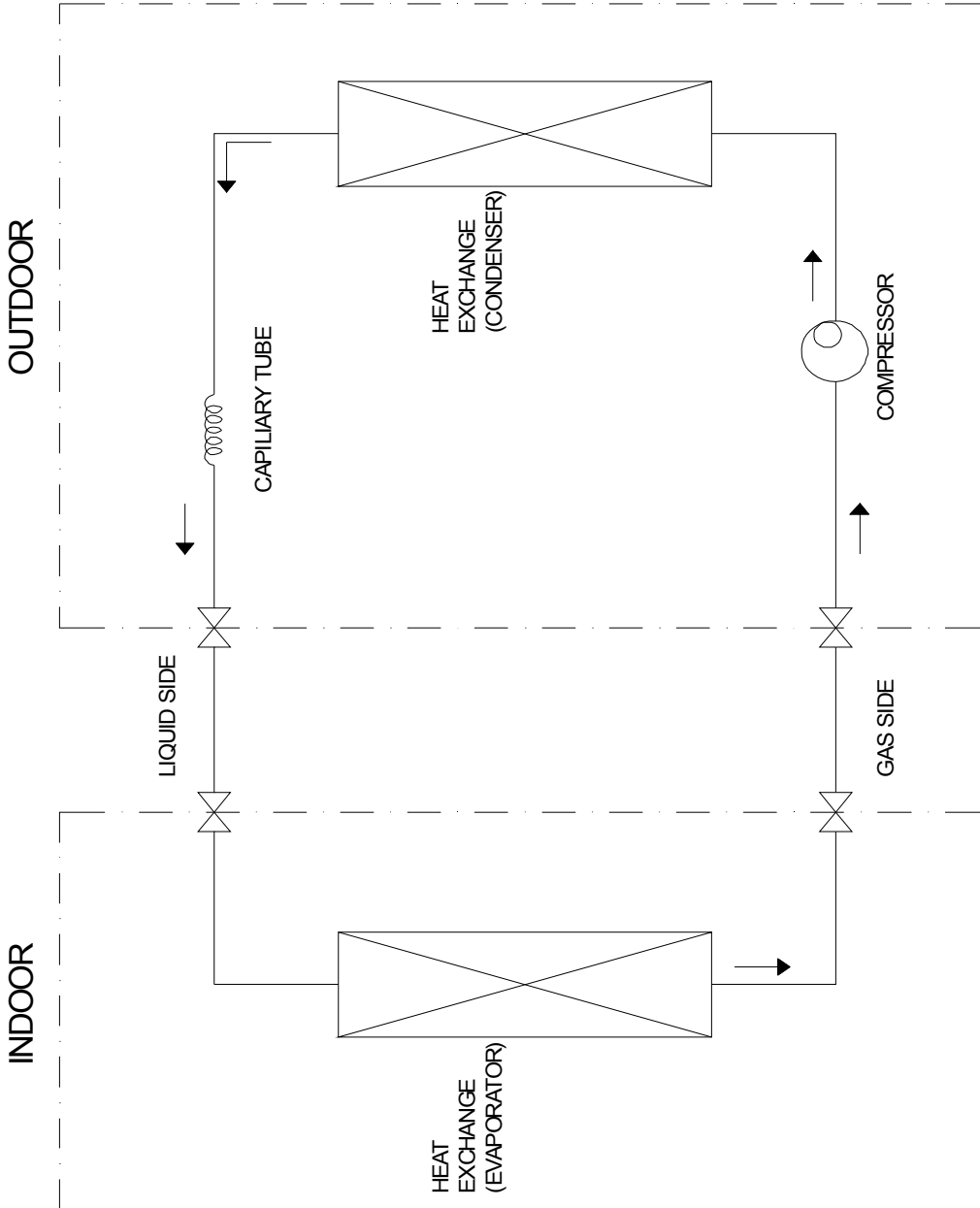
Cooling operation

All units may operate in the cooling mode up to a maximum outdoor ambient temperature of 112°F (50°C), and down to a minimum outdoor ambient temperature of 32°F (-0°C). The indoor side may be operated in the cooling mode with indoor ambient temperature greater than 62.6°F (17°C). *NOTE: Fan motor runs continuously in cooling mode.*

Heating operation

Heat pump units may operate in the heating mode up to a maximum outdoor ambient temperature of 70°F (21°C), and down to a minimum outdoor ambient temperature of 5°F (-15°C). The indoor side may be operated in the heating mode with indoor ambient temperature less than 86°F (30°C).. *NOTE: Reversing valve is powered in heat mode.*

REFRIGERANT CYCLE



SPECIFICATIONS

MSC092E15** & MSC123E15**

Specification_15 SEER Series

Indoor			MSC092E15AX	MSC123E15AX
Outdoor			MSC092E15MC	MSC123E15MC
Power supply		Ph-V-Hz	115V~ 60Hz, 1Ph	208-230V~ 60Hz, 1Ph
Cooling	Capacity	Btu/h	9000	12000
	EER	Btu/W	9	9
	SEER		15	15
Heating	Capacity	Btu/h	----	----
	HSPF		----	----
Energy Star			NO	NO
Minimum Circuit Ampacity		A	19	10
Max Fuse		A	30	15
Moisture Removal		L/h	1.0	1.2
Compressor	Model		DA108X1C-23EZ	DA108X1C-20FZ3
	Brand		GMCC	GMCC
	Type		ROTARY	ROTARY
Indoor fan motor		Model	RPG15A	RPG20B
		Brand	Welling	Welling
		Blower RLA	0.63	0.23
		Blower LRA	63	51
		Input	W	43
		Capacitor	uF	1.5
		Speed(Hi/Mi/Lo)	r/min	1200 / 1050 / 800
Indoor air flow (Hi/Mi/Lo)		m3/h	480/420/320	600/530/400
Indoor noise level (Hi/Mi/Lo)		dB(A)	39/35/28	39/35/31
Indoor unit	Dimension(W*D*H)	mm	680x255x178	770x255x188
	Dimension(W*D*H)	inch	26.77x10.04x7.01	30.31x10.04x7.40
	Packing (W*D*H)	mm	745x255x330	835x265x330
	Packing (W*D*H)	inch	29.33x10.04x12.99	32.87x10.43x12.99
	Net/Gross weight	Kg	7 / 8	7.5 / 9.5
	Net/Gross weight	lbs.	15 / 18	17 / 21
	Model		YDK24-6AS	YDK24-6GB
	Brand		Welling	Welling
Outdoor fan motor		Input	W	75/66
		Capacitor	uF	2.5 / 6.0
		Speed	r/min	860 / -- / 660
Outdoor air flow		m3/h	1400	1900
Outdoor noise level		dB(A)	54	55
Outdoor unit	Dimension(W*D*H)	mm	660x265x540	780x250x540
	Dimension(W*D*H)	inch	25.98x10.43x21.26	30.71x9.84x21.26
	Packing (W*D*H)	mm	790x355x620	910x335x585
	Packing (W*D*H)	inch	31.10x13.98x24.41	35.83x13.19x23.03
	Net/Gross weight	Kg	28.5 / 31.5	28 / 30
	Net/Gross weight	lbs.	63 / 69	62 / 66
Refrigerant type (g)		g	R410A/900g	R410A/650g
Refrigerant type (oz.)		oz.	R410A/31.8	R410A/22.93
Design pressure		MPa	550/340 PSIG	550/340 PSIG
Refrigerant piping	Liquid side/ Gas side	mm(inch)	Φ6.35/Φ9.52(1/4"/3/8")	Φ6.35/Φ9.52(1/4"/3/8")
	Max. refrigerant pipe length	ft. (m)	66 (20)	66 (20)
	Max. difference in level	ft. (m)	26.25 (8)	26.25 (8)
Connection wiring			16#(Optional)	16#(Optional)
Thermostat type			Remote Control	Remote Control

NOTE: The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.

SPECIFICATIONS

MSC[18-24]3E15**

Specification_15 SEER Series

Indoor			MSC183E15AX	MSC243E15AX
Outdoor			MSC183E15MC	MSC243E15MC
Power supply		Ph-V-Hz	208-230V~ 60Hz, 1Ph	208-230V~ 60Hz, 1Ph
Cooling	Capacity	Btu/h	18000	22000
	EER	Btu/W	9	9
	SEER		15	15
Heating	Capacity	Btu/h	----	----
	HSPF		----	----
Energy Star			NO	NO
Minimum Circuit Ampacity		A	14	16
Max Fuse		A	20	25
Moisture Removal		L/h	1.8	2.4
Compressor	Model		DA130M1C-31FZ	DA150S1C-20FZ
	Brand		GMCC	GMCC
	Type		ROTARY	ROTARY
Indoor fan motor	Model		RPG28H	RPG45B
	Brand		Welling	Broad-ocean
	Blower RLA		0.36	0.56
	Blower LRA		74.4	124
	Input	W	58.5	80.5
	Capacitor	uF	1.5	3.0
	Speed(Hi/Mi/Lo)	r/min	1250 / 1100 / 800	1200 / 1100 / 900
	Indoor air flow (Hi/Mi/Lo)	m3/h	750/660/480	1250/1150/950
Indoor noise level (Hi/Mi/Lo)		dB(A)	42/39/31	47/45/39
Indoor unit	Dimension(W*D*H)	mm	905x275x198	1030x315x218
	Dimension(W*D*H)	inch	35.63x10.83x7.80	40.55x12.40x8.58
	Packing (W*D*H)	mm	970x270x345	1115x395x300
	Packing (W*D*H)	inch	38.19x10.63x13.58	43.90x15.55x11.81
	Net/Gross weight	Kg	9 / 11.5	12 / 15
	Net/Gross weight	lbs.	20 / 25	26 / 33
	Model		YDK49-6B	YDK53-6FB(B)
	Brand		Welling	Welling
Outdoor fan motor	Input	W	119/96	136/130
	Capacitor	uF	2.5	2.5
	Speed	r/min	860 / -- / 680	930 / -- / 830
	Outdoor air flow	m3/h	2300	2700
Outdoor noise level		dB(A)	59	59
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	34.5 / 37	44.5 / 48
	Net/Gross weight	lbs.	76 / 82	98 / 106
Refrigerant type (g)		g	R410A/850g	R410A/1180g
Refrigerant type (oz.)		oz.	R410A/29.9	R410A/41.6
Design pressure		MPa	550/340 PSIG	550/340 PSIG
Refrigerant piping	Liquid side/ Gas side	mm(inch)	Φ6.35/Φ12.7(1/4"/1/2")	Φ9.52/Φ15.9(3/8"/5/8")
	Max. refrigerant pipe length	ft. (m)	82 (25)	82 (25)
	Max. difference in level	ft. (m)	33 (10)	33 (10)
Connection wiring			16#(Optional)	16#(Optional)
Thermostat type			Remote Control	Remote Control

NOTE: The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.

SPECIFICATIONS

MSH092E15** & MSH123E15**

Specification_15 SEER Series

Indoor			MSH092E15AX	MSH123E15AX
Outdoor			MSH092E15MC	MSH123E15MC
Power supply		Ph-V-Hz	115V~ 60Hz, 1Ph	208-230V~ 60Hz, 1Ph
Cooling	Capacity	Btu/h	9000	12000
	EER	Btu/W	10	9
	SEER		15	15
Heating	Capacity	Btu/h	9000	12000
	HSPF		8.2	8.2
Energy Star				NO
Minimum Circuit Ampacity		A	19	10
Max Fuse		A	30	15
Moisture Removal		L/h	1.0	1.2
Compressor	Model		DA108X1C-23EZ	DA108X1C-23EZ
	Brand		GMCC	GMCC
	Type		ROTARY	ROTARY
Indoor fan motor	Model		RPG15A	RPG20B
	Brand		Welling	Welling
	Blower RLA		0.63	0.23
	Blower LRA		63	51
	Input	W	46	43
	Capacitor	uF	3.0	1.5
Speed(Hi/Mi/Lo)		r/min	1200 / 1050 / 850	1200 / 1050 / 800
Indoor air flow (Hi/Mi/Lo)		m3/h	480/420/320	600/530/400
Indoor noise level (Hi/Mi/Lo)		dB(A)	39/35/29	39/35/31
Indoor unit	Dimension(W*D*H)	mm	680x255x178	770x255x188
	Dimension(W*D*H)	inch	26.77x10.04x7.01	30.31x10.04x7.40
	Packing (W*D*H)	mm	745x255x330	835x265x330
	Packing (W*D*H)	inch	29.33x10.04x12.99	32.87x10.43x12.99
	Net/Gross weight	Kg	7 / 8	7.5 / 9.5
	Net/Gross weight	lbs.	15 / 18	17 / 21
Outdoor fan motor	Model		YDK24-6AS	YDK24-6GB
	Brand		Welling	Welling
	Input	W	64/47	75/66
	Capacitor	uF	3.0	2.5 / 6.0
	Speed	r/min	860 / -- / 660	940 / -- / 835
	Outdoor air flow	m3/h	1400	1900
	Outdoor noise level	dB(A)	56	57
Outdoor unit	Dimension(W*D*H)	mm	660x265x540	780x250x540
	Dimension(W*D*H)	inch	25.98x10.43x21.26	30.71x9.84x21.26
	Packing (W*D*H)	mm	790x355x620	910x335x585
	Packing (W*D*H)	inch	31.10x13.98x24.41	35.83x13.19x23.03
	Net/Gross weight	Kg	28.5 / 31.5	30 / 32
	Net/Gross weight	lbs.	63 / 69	66 / 71
Refrigerant type (g)		g	R410A/900g	R410A/910g
Refrigerant type (oz.)		oz.	R410A/31.8	R410A/32.1
Design pressure		MPa	550/340 PSIG	550/340 PSIG
Refrigerant piping		Liquid side/ Gas side	mm(inch)	Φ6.35/Φ9.52(1/4"/3/8")
Max. refrigerant pipe length		ft. (m)	66 (20)	66 (20)
Max. difference in level		ft. (m)	26.25 (8)	26.25 (8)
Connection wiring			16#(Optional)	16#(Optional)
Thermostat type			Remote Control	Remote Control

NOTE: The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.

SPECIFICATIONS

MSH[18-24]3E15**

Specification_15 SEER Series

Indoor			MSH183E15AX	MSH243E15AX
Outdoor			MSH183E15MC	MSH243E15MC
Power supply		Ph-V-Hz	208-230V~ 60Hz, 1Ph	208-230V~ 60Hz, 1Ph
Cooling	Capacity	Btu/h	18000	22000
	EER	Btu/W	9	9
	SEER		15	15
Heating	Capacity	Btu/h	18000	22000
	HSPF		8.2	8.2
Energy Star			NO	NO
Minimum Circuit Ampacity		A	14	16
Max Fuse		A	20	25
Moisture Removal		L/h	1.8	2.4
Compressor	Model		DA130M1C-31FZ	DA150S1C-20FZ
	Brand		GMCC	GMCC
	Type		ROTARY	ROTARY
Indoor fan motor	Model		RPG28H	RPG45B
	Brand		Welling	Broad-ocean
	Blower RLA		0.36	0.56
	Blower LRA		74.4	124
	Input	W	58.5	80.5
	Capacitor	uF	1.5	3.0
	Speed(Hi/Mi/Lo)	r/min	1250 / 1100 / 800	1200 / 1100 / 900
	Indoor air flow (Hi/Mi/Lo)	m3/h	750/660/480	1250/1150/950
Indoor noise level (Hi/Mi/Lo)		dB(A)	42/39/31	49/45/39
Indoor unit	Dimension(W*D*H)	mm	905x275x198	1030x315x218
	Dimension(W*D*H)	inch	35.63x10.83x7.80	40.55x12.40x8.58
	Packing (W*D*H)	mm	970x270x345	1115x395x300
	Packing (W*D*H)	inch	38.19x10.63x13.58	43.90x15.55x11.81
	Net/Gross weight	Kg	9 / 11.5	12 / 15
	Net/Gross weight	lbs.	20 / 98	26 / 33
Outdoor fan motor	Model		YDK49-6B	YDK53-6FB(B)
	Brand		Welling	Welling
	Input	W	119/96	136/130
	Capacitor	uF	2.5	2.5
	Speed	r/min	860 / -- / 680	930 / -- / 830
Outdoor air flow		m3/h	2300	2700
Outdoor noise level		dB(A)	59	60
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	37.5 / 40	47 / 50.5
	Net/Gross weight	lbs.	83 / 88	104 / 111
Refrigerant type (g)		g	R410A/1200g	R410A/1600g
Refrigerant type (oz.)		oz.	R410A/42.3	R410A/56.44
Design pressure		MPa	550/340 PSIG	550/340 PSIG
Refrigerant piping	Liquid side/ Gas side	mm(inch)	Φ6.35/Φ12.7(1/4"/1/2")	Φ9.52/Φ15.9(3/8"/5/8")
Max. refrigerant pipe length		ft. (m)	82 (25)	82 (25)
Max. difference in level		ft. (m)	33 (10)	33 (10)
Connection wiring			16#(Optional)	16#(Optional)
Thermostat type			Remote Control	Remote Control

NOTE: The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.

SPECIFICATIONS

MSC[09-12]2E19** & MSC123E19**

Specification_19 SEER Series

Indoor model		MSH092E19AX	MSH122E19AX	MSH123E19AX
Outdoor model		MSH092E19MC	MSH122E19MC	MSH123E19MC
Features				
Follow me		YES	YES	YES
Turbo Mode		YES	YES	YES
Auto-restart		YES	YES	YES
LCD display		YES	YES	YES
Auto level swing		YES	YES	YES
Active Carbon		YES	YES	YES
Timer		24	24	24
Capacity				
Cooling Capacity	Btu/h	9000	12000	12300
heating Capacity	Btu/h	10000	13000	13000
Electrical parts				
Power Supply	V~,Hz,Ph	115V,60Hz,1Ph	115V,60Hz,1Ph	230V,60Hz,1Ph
Power Input (W)	Cooling	650	950	980
	Heating	760	1330	1060
Operating Current (A)	Cooling	7.2	9.6	4.7
	Heating	8	13.5	5.7
RATED CURRENT (A)	Cooling	12	13.5	5.7
	Heating	12	13.5	5.7
Performance				
SEER		19	19	18.8
Energy star		YES	YES	YES
Air Flow Volume	Indoor(m3/h)	750	800	850
Noise Level (dB(A))	Indoor(Hi/Med/Lo)	39/35/32	40/38/35	41/37/34
	Outdoor	53	53	54
Dimension & Weight				
Net Dimension (mm)	Indoor (W*H*D)	920x292x223	920x292x223	920x292x223
	(inch)	36 X 11 1/2 X 8 3/4	36 X 11 1/2 X 8 3/4	36 X 11 1/2 X 8 3/4
	(mm)	Outdoor (W*H*D)	760x590x285	760x590x285
	(inch)		30 x 23 x 11	30 x 23 x 11
Net Weight (kg)	Indoor/Outdoor	11.5/37.5	11.5/ 37.5	11.5 / 39.5
	(Lb)	26/83	26/83	26/88
Packing Dimension (mm)	Indoor (W*H*D)	1015x368x295	1015x368x295	1015x368x295
Packing Dimension (inch)	Indoor (W*H*D)	39 15/16 X 14 1/2 X 11 5/8	39 15/16 X 14 1/2 X 11 5/8	39 15/16 X 14 1/2 X 11 5/8
	(mm)	Outdoor (W*H*D)	887x655x355	887x655x355
	(inch)	Outdoor (W*H*D)	34 15/16x25 13/16x14	34 15/16x25 13/16x14
Gross Weight (kg)	Indoor/Outdoor	14.5 / 39.5	14.5/40	14.5 / 42
Gross Weight (Lb)	Indoor/Outdoor	32/88	32/88	32/93
Piping Size (mm(inch))	Liquid	Φ6.35(1/4")	Φ6.35(1/4")	Φ6.35(1/4")
	Gas	Φ9.53(3/8")	Φ12.7(1/2")	Φ12.7(1/2")

NOTE: The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.

SPECIFICATIONS

MSH[09-12]2E19** & MSH123E19**

Specification_19 SEER Series

Indoor model		MSC092E19AX	MSC122E19AX	MSC123E19AX
Outdoor model		MSC092E19MC	MSC122E19MC	MSC123E19MC
Features				
Follow me		YES	YES	YES
Turbo Mode		YES	YES	YES
Auto-restart		YES	YES	YES
LCD display		YES	YES	YES
Auto level swing		YES	YES	YES
Active Carbon		YES	YES	YES
Timer		24	24	24
Capacity				
Cooling Capacity	Btu/h	9000	12000	12200
heating Capacity	Btu/h			
Electrical parts				
Power Supply	V~,Hz,Ph	115V,60Hz,1Ph	115V,60Hz,1Ph	230V,60Hz,1Ph
Power Input (W)	Cooling	650	950	980
	Heating			
Operating Current (A)	Cooling	7.2	9.6	4.7
	Heating			
RATED CURRENT (A)	Cooling	11	11	6.1
	Heating			
Performance				
SEER		19	19	19
Energy star		YES	YES	YES
Air Flow Volume	Indoor(m3/h)	750	800	850
Noise Level (dB(A))	Indoor(Hi/Med/Lo)	39/35/32	40/38/35	41/37/34
	Outdoor	53	53	54
Dimension & Weight				
Net Dimension (mm)	Indoor (W*H*D)	920x292x223	920x292x223	920x292x223
	(inch)	36 X 11 1/2 X 8 3/4	36 X 11 1/2 X 8 3/4	36 X 11 1/2 X 8 3/4
	(mm)	Outdoor (W*H*D)	760x590x285	760x590x285
	(inch)		30 x 23 x 11	30 x 23 x 11
Net Weight (kg)	Indoor/Outdoor	11.5/37.5	11.5/ 37.5	11.5 / 39.5
	(Lb)	26/83	26/83	26/88
Packing Dimension (mm)	Indoor (W*H*D)	1015x368x295	1015x368x295	1015x368x295
Packing Dimension (inch)	Indoor (W*H*D)	39 15/16 X 14 1/2 X 11 5/8	39 15/16 X 14 1/2 X 11 5/8	39 15/16 X 14 1/2 X 11 5/8
	(mm)	Outdoor (W*H*D)	887x655x355	887x655x355
	(inch)	Outdoor (W*H*D)	34 15/16x25 13/16x14	34 15/16x25 13/16x14
Gross Weight (kg)	Indoor/Outdoor	14.5 / 39.5	14.5/40	14.5 / 42
Gross Weight (Lb)	Indoor/Outdoor	32/88	32/88	32/93
Piping Size (mm(inch))	Liquid	Φ6.35(1/4")	Φ6.35(1/4")	Φ6.35(1/4")
	Gas	Φ9.53(3/8")	Φ12.7(1/2")	Φ12.7(1/2")

NOTE: The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.

SPECIFICATIONS

MSC[18-24]3E19**

Specification_19 SEER Series

Indoor model		MSH183E19AX	MSH243E19AX
Outdoor model		MSH183E19MC	MSH243E19MC
Features			
Follow me		YES	YES
Turbo Mode		YES	YES
Auto-restart		YES	YES
LCD display		YES	YES
Auto level swing		YES	YES
Active Carbon		YES	YES
Timer		24	24
Capacity			
Cooling Capacity	Btu/h	18300	24000
heating Capacity	Btu/h	19200	25400
Electrical parts			
Power Supply	V~,Hz,Ph	230V,60Hz,1Ph	230V,60Hz,1Ph
Power Input (W)	Cooling	1460	2100
	Heating	1480	2050
Operating Current (A)	Cooling	6.7	9.1
	Heating	6.6	8.9
RATED CURRENT (A)	Cooling	9.3	12
	Heating	9.3	12
Performance			
SEER		19.2	18
Energy star		YES	YES
Air Flow Volume	Indoor(m3/h)	1150	1600
Noise Level (dB(A))	Indoor(Hi/Med/Lo)	48/40/36	50/48/46
	Outdoor	54	59
Dimension & Weight			
Net Dimension (mm)	Indoor (W*H*D)	998x322x240	1445x340x277
	(inch)	39 X 12 1/2 X 9 1/2	56 7/8 x 13 3/8 x 10 7/8
	(mm)	Outdoor (W*H*D)	845x700x320
	(inch)		900x315x860
		33 x 27 1/2 x 12 1/2	35 x 12 x 33 1/2
Net Weight (kg)	Indoor/Outdoor	13 / 47.5	26 / 72
	(Lb)	29/105	58/159
Packing Dimension (mm)	Indoor (W*H*D)	1080x320x400	1530x365x420
Packing Dimension (inch)	Indoor (W*H*D)	42 1/2 X 12 5/8 X 15 3 /4	60 1/4 x 14 3/8 16 9/16
	(mm)	Outdoor (W*H*D)	965x755x395
	(inch)	Outdoor (W*H*D)	1043x915x395
		38 x29 12/16x15 9/16	41 1/16x36 x15 9/16
Gross Weight (kg)	Indoor/Outdoor	17 / 51	32 / 76
Gross Weight (Lb)	Indoor/Outdoor	64/113	71/168
Piping Size (mm(inch))	Liquid	Φ9.53(3/8")	Φ9.53(3/8")
	Gas	Φ16(5/8")	Φ16(5/8")

NOTE: The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.

SPECIFICATIONS

MSH[18-24]3E19**

Specification_19 SEER Series

Indoor model		MSC183E19AX	MSC243E19AX
Outdoor model		MSC183E19MC	MSC243E19MC
Features			
Follow me		YES	YES
Turbo Mode		YES	YES
Anto-restart		YES	YES
LCD display		YES	YES
Auto level swing		YES	YES
Active Carbon		YES	YES
Timer		24	24
Capacity			
Cooling Capacity	Btu/h	18000	24000
heating Capacity	Btu/h		
Electrical parts			
Power Supply	V~,Hz,Ph	230V,60Hz,1Ph	230V,60Hz,1Ph
Power Input (W)	Cooling	1460	2100
	Heating		
Operating Current (A)	Cooling	6.7	9.1
	Heating		
RATED CURRENT (A)	Cooling	10.8	12.7
	Heating		
Performance			
SEER		20.3	18.5
Energy star		YES	YES
Air Flow Volume	Indoor(m3/h)	1150	1600
Noise Level (dB(A))	Indoor(Hi/Med/Lo)	48/40/36	50/48/46
	Outdoor	54	59
Dimension & Weight			
Net Dimension (mm)	Indoor (W*H*D)	998x322x240	1445x340x277
	(inch)	39 X 12 1/2 X 9 1/2	56 7/8 x 13 3/8 x 10 7/8
	(mm)	Outdoor (W*H*D)	845×700×320
	(inch)		33 x 27 1/2 x 12 1/2
Net Weight (kg)	Indoor/Outdoor	13 / 47.5	26 / 72
	(Lb)	29/105	58/159
Packing Dimension (mm)	Indoor (W*H*D)	1080x320x400	1530x365x420
Packing Dimension (inch)	Indoor (W*H*D)	42 1/2 X 12 5/8 X 15 3 /4	60 1/4 x 14 3/8 16 9/16
	(mm)	Outdoor (W*H*D)	965×755×395
	(inch)	Outdoor (W*H*D)	38 ×29 12/16×15 9/16
Gross Weight (kg)	Indoor/Outdoor	17 / 51	32 / 76
Gross Weight (Lb)	Indoor/Outdoor	64/113	71/168
Piping Size (mm(inch))	Liquid	Φ9.53(3/8")	Φ9.53(3/8")
	Gas	Φ16(5/8")	Φ16(5/8")

NOTE: The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.

REMOTE CONTROL

15 SEER & 19 SEER

REMOTE CONTROL SPECIFICATIONS:

Model	MSC[092, 122, 123, 183, 243]E**
	MSH[092, 122, 123, 183, 243]E**
Rated Voltage	3.0V (Dry batterieis LR03 x 2)
Lowest Voltage of CPC Emitting Signal	2.0V
Transmitting Distance	8m / 26'
Environment	23°F - 140°F
	-5°C - 60°C

PERFORMANCE FEATURES:

1. Operating Modes: AUTO, COOL, DRY, HEAT (cooling only model without heat) and FAN.
2. Timer Setting Function in 24 hours.
3. Indoor Setting Temperature range: 62°F - 86°F (17°C - 30°C).
4. Full function LCD (Liquid Crystal Display).
1. **TEMP Button ▼**: Press this button to decrease the indoor temperature setting.

REMOTE CONTROL FEATURES:

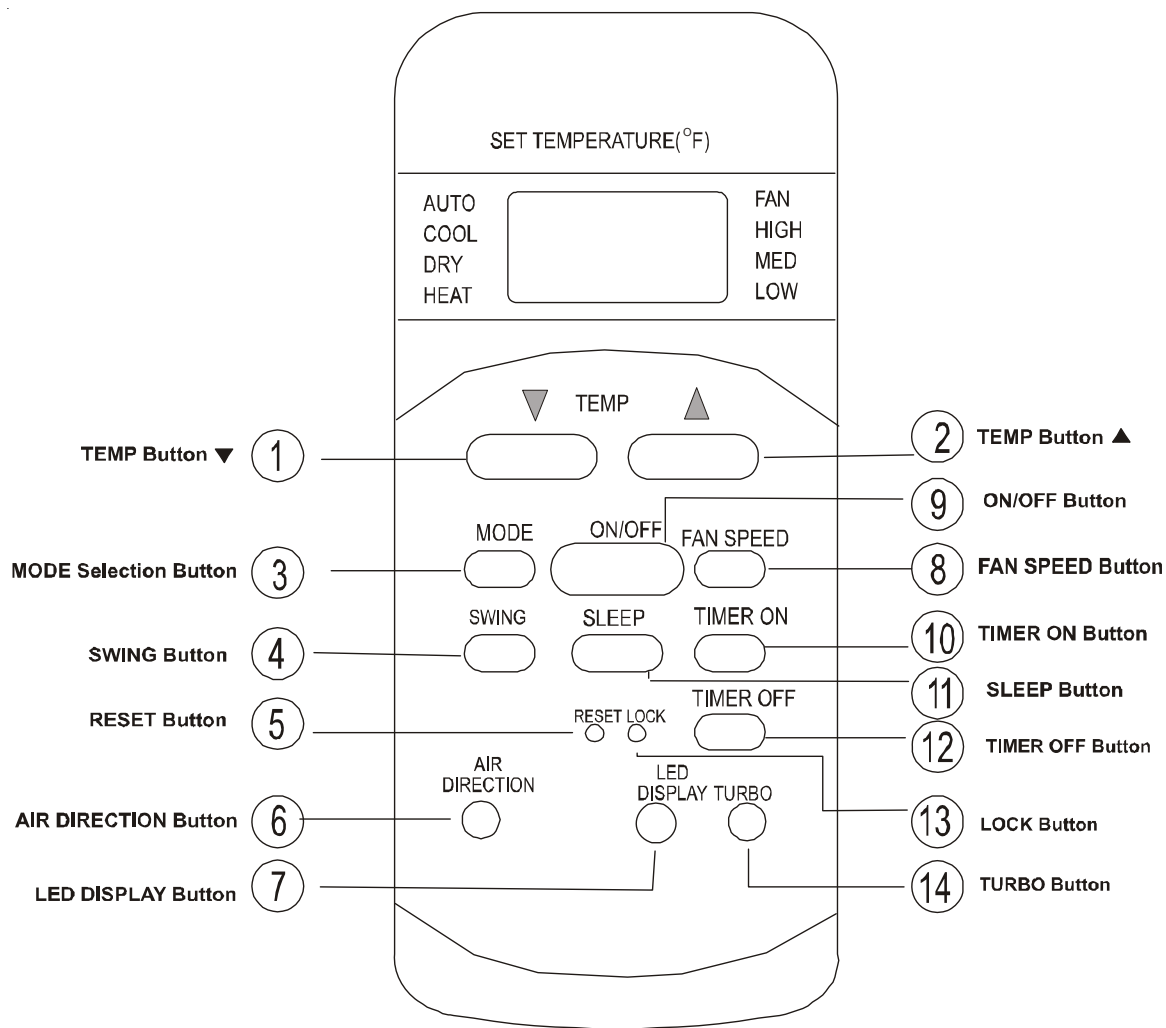


Figure 1

REMOTE CONTROL

2. **TEMP Button ▲**: Press this button to increase the indoor temperature setting.
3. **MODE Selection Button**: Each time the button is pressed, the operation mode is shifted in the direction of the arrow:


NOTE: COOL only model has no HEAT feature.

4. **SWING Button**: Press this switch button to activate auto swing feature of the horizontal louver. Push it again to stop.
5. **RESET Button**: When you press the recessed RESET button, all current settings are cancelled and the control will return to the initial settings.
6. **AIR DIRECTION Button**: Press this button to change the swing angle of the louver. The swing angle of the louver is 6° for each press. When the louver swing at a certain angle which would affect the cooling and heating effect of the air conditioner, it would automatically change the swing direction. No symbol will appear in the display area when this button is pressed.
7. **LED DISPLAY Button**: Press this button to clear the digit display in the air conditioner, press it again to illuminate (Not available for the units without LED display window).
8. **FAN SPEED Button**: Used to select the Fan Speed in four steps of AUTO, LOW, MED or HIGH. Each time the button is pressed, the fan speed mode is shifted.
9. **ON/OFF Button**: Press this button to start operation; press the button again to stop operation.
10. **TIMER ON Button**: Press this button to initiate the AUTO-ON time sequence. Each press will increase the auto-timed setting in 30 minute increments. When the setting time displays 10h, each press will increase the auto-timed setting 60 minutes increments.
 To cancel the auto-timed program, simply adjust the auto-on time to 0.0.
11. **SLEEP Button**: Press this button to go into the Energy-Saving operation mode. Press again to cancel. This function can only be used on COOL, HEAT and AUTO modes and will maintain the most comfortable temperature for you.
NOTE: While the unit is running under SLEEP operation mode, pressing the MODE, FAN SPEED or ON/OFF button will cancel the SLEEP operation mode.
12. **TIMER OFF Button**: Press this button to initiate the AUTO-OFF time sequence. Each press will increase the auto-timed setting in 30 minutes increments. When the setting time displays 10h, each press will increase the auto-timed setting in 60 minutes increments. To cancel the auto-timed program, simply adjust the auto-off time to 0.0.
13. **LOCK Button**: When you press the recessed LOCK button, all current settings are locked in and the remote control does not accept any operation except that of the LOCK. Press again to cancel the LOCK mode.

15 SEER & 19 SEER

14. **TURBO Button**: When pushing this button on COOL mode, the air conditioner ramps up into a more powerful cooling operation. Push again to cancel the TURBO function. (Not available for air conditioners without TURBO function.)

INDICATORS ON DISPLAY PANEL

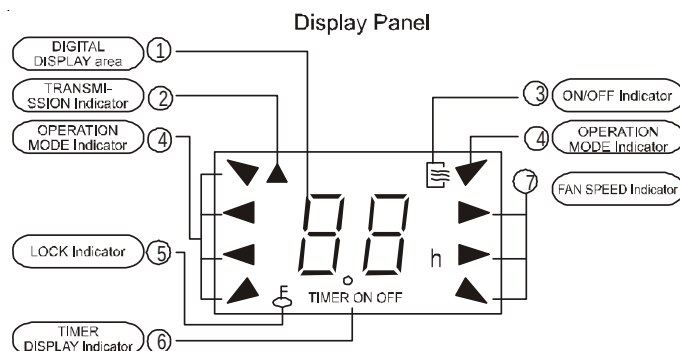


Figure 2

1. **DIGITAL DISPLAY area**: This area will show the set temperature and, if in the TIMER mode, will show the ON and OFF settings of the TIMER. If in the FAN mode, nothing will be displayed.
2. **TRANSMISSION Indicator**: This indicator flashes one time when remote control transmits signals to the indoor unit.
3. **ON/OFF Indicator**: This symbol appears when the unit is turned on by the remote control, and disappears when the unit is turned off.
4. **OPERATION MODE Indicator**: When the MODE button is pressed, the current operating mode is displayed: AUTO, COOL, DRY, HEAT (cooling only models without heat), or FAN mode.
5. **LOCK Indicator**: LOCK is displayed by pushing the LOCK button. Pushing the LOCK button a second time will clear the display.
6. **TIMER DISPLAY Indicator**: This display area shows the settings of the TIMER. If only the starting time of operation is set, it will display as TIMER ON. If only the ending time of operation is set, it will display as TIMER OFF. If both operations are set, it will show TIMER ON-OFF which indicates you have chosen to set both the starting time and ending time.

REMOTE CONTROL

7. **FAN SPEED Indicator:** Press the FAN SPEED button to select the desired fan speed setting (Auto, Low, Med, or High). Your selection of Low, Med, or High will be displayed in the LCD window; Auto fan speed will not be displayed.

NOTE: All representations shown on the Display Panel graphic are for the purpose of familiarizing you with the display functions. During actual operation, only the relevant functioning displays are shown on the display panel.

OPERATING THE REMOTE CONTROL

INSTALLING/REPLACING BATTERIES



WARNING

Do not mix old and new batteries. Do not mix alkaline, standard (Zinc-Carbon) or rechargeable (nickel-Cadmium) batteries.

The remote control uses two alkaline dry batteries (LR03X2).

1. To install the batteries, slide open the back cover of the battery compartment and install the batteries according to the direction (+ / -) as shown on the remote control.
2. To replace the old batteries, use the same method as mentioned above.

NOTE:

- When replacing batteries, do not use old batteries or a different type battery. Do not use a mixture of old and new batteries. This may cause the remote control to malfunction.
- If the remote control is not used for several weeks, remove the batteries. Otherwise, battery leakage may damage the remote control.
- Average battery life under normal use is approximately 6 months.
- Replace the batteries when there is no answering beep from the indoor unit or if the Transmission Indicator light fails to light.
- Do not dispose batteries as unsorted municipal waste. Collection of such waste separately for special treatment is necessary.

AUTOMATIC OPERATION

Turn on the power. The OPERATION indication lamp on the display panel of the indoor unit will begin to flash and will turn off after flashing 6 times.

1. Use the MODE button to select AUTO.

15 SEER & 19 SEER

2. Push the TEMP button to set the desired temperature within a range of 62°F - 86°F (17°C - 30°C).
3. Push the ON/OFF button to start the air conditioner. The OPERATION lamp on the display panel of the indoor unit lights. The FAN SPEED is automatically set and there are no fan speed indicators shown on the display panel of the remote control.
4. Push the ON/OFF button again to stop the unit's operation.

NOTE:

- A. In the AUTO mode, the air conditioner can logically choose the mode of COOL, FAN and HEAT by sensing the difference between the actual ambient room temperature and the set temperature on the remote control.
- B. If the AUTO mode is not comfortable for you, the desired mode can be selected manually.

COOL/ HEAT (COOLING ONLY MODEL WITH NO HEAT) AND FAN OPERATION

1. AUTO mode setting can be manually overridden by setting the unit for COOL, HEAT or FAN mode.
2. Press the TEMP button to set the desired temperature within a range of 62°F - 86°F (17°C - 30°C).
3. Press the FAN SPEED to select the FAN mode of AUTO, HIGH, MED or LOW.
4. Push the ON/OFF button and the operation lamp lights and the air conditioner starts to operate at your selected settings. Push the ON/OFF button again to stop this unit operation.

NOTE: The FAN mode cannot be used to control the temperature. While in this mode, only steps 1, 3 and 4 may be performed.

DRY OPERATION

1. Push the MODE button to select DRY.
2. Push the TEMP button to set the desired temperature within a range of 62°F - 86°F (17°C - 30°C).
3. Push the ON/OFF button. The OPERATION lamp lights and the air conditioner starts to operate in DRY mode at LOW fan speed. Push the ON/OFF button again to stop the unit's operation.

REMOTE CONTROL

TIMER OPERATION

Push the TIMER ON button to set the auto-on time and the TIMER OFF button to set the auto-off time.

1. To set the starting time:
 - A. Push the TIMER ON button; the remote control shows TIMER ON, the last set time for the starting operation and the signal "h" will be shown on the DIGITAL DISPLAY area. You are now ready to reset the time to START the operation.
 - B. Push the TIMER ON button again to set desired unit start time.
 - C. After setting the TIMER ON, there will be a one-half second delay before the remote control transmits the signal to the air conditioner. After approximately another 2 seconds, the signal "h" disappears and the set temperature will reappear on the digital display.
2. To set the stopping time:
 - A. Push the TIMER OFF button and the remote control will show TIMER OFF, the last set time for stopping operation and the signal "h" will be shown on the DIGITAL DISPLAY area. You are now ready to reset the time of the STOP operation.
 - B. Push the TIMER OFF button again to set the time you want to stop the operation.
 - C. After setting the TIMER OFF, there will be a one-half second delay before the remote control transmits the signal to the air conditioner. After approximately another 2 seconds, the signal "h" disappears and the set temperature will reappear on the digital display.

SET THE STARTING & STOPPING TIME

- A. Push the TIMER ON button. The remote control will show TIMER ON, the last set time for START operation and the signal "h" will be shown on the DIGITAL display area. You are now ready to readjust the TIMER ON to start the operation.
- B. Push the TIMER ON button again to set the time you want to start the operation.

15 SEER & 19 SEER

- C. Push the TIMER OFF button. The remote control will show TIMER OFF, the last set time for STOP operation and the signal "h" will be shown on the DIGITAL display area. You are now ready to reset the time to STOP operation.
- D. Press the TIMER OFF button again to set the time you want to stop the operation.
- E. After setting the TIMER, there will be a one-half second delay before the remote control transmits the signal to the air conditioner. After approximately another 2 seconds, the signal "h" disappears and the set temperature will reappear on the digital display.

Changing the TIMER

- To change the TIMER ON/OFF time, press the corresponding TIMER button and reset the time.
- To cancel the TIMER ON/OFF setting, adjust the TIMER time to 0:00.

NOTE: The time entered on this function is not the current, real time. It is the time you want to program the unit to automatically begin and end operation.

To receive the maximum performance from your unit, please read and follow the following cautions.



CAUTIONS

- Ensure there are no obstacles between the remote control and the receiver of the indoor unit.
- Keep the remote control away from liquids.
- Do not expose the remote control to high temperatures or to radiation.
- Keep the indoor received out of direct sunlight.
- Remote control should be kept away from EMI (electro-magnetic interference) as is present in some household appliances.

SERVICE

15 SEER

Torque Wrench Requirements for installation

Outside Diameter		Torque	Additional Tightening Torque
mm	Inch	N.cm	N.cm
86.35	1/4	1500 (153kgf.cm)	1600 (163kgf.cm)
89.52	3/8	2500 (255kgf.cm)	2600 (265kgf.cm)
8 12.70	1/2	3500 (357kgf.cm)	2600 (367kgf.cm)

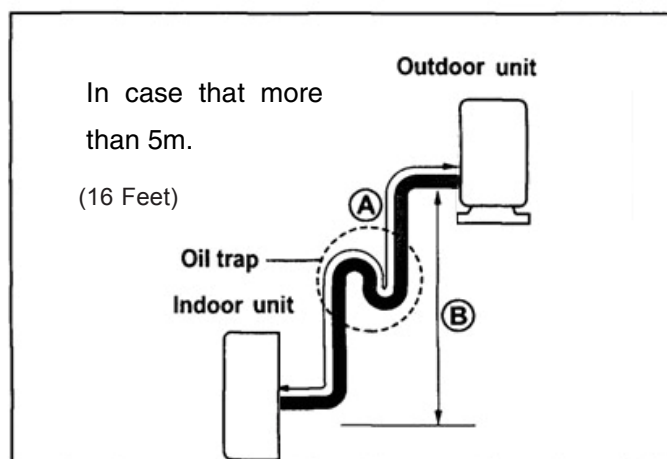
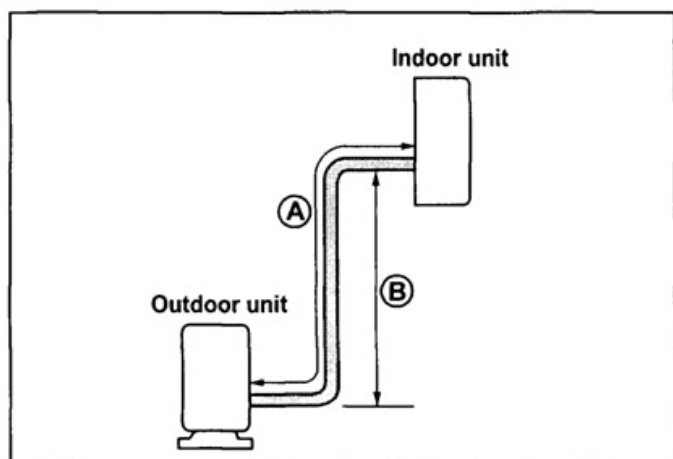
Cable Connections:

The indoor and outdoor unit connection cable should be AWF16# for 9k, 12k, 18k, 22k.

USE COPPER SUPPLY WIRES ONLY.

Pipe Length & Elevation Requirements

Model	Pipe Size		Line Set Length Provided with Unit Feet (m)	Max Elevation B Feet (m)	Max. Length Overall A Feet (m)	Additional Refrigerant Per foot of Additional Line Oz. (gram)
	Vapor	Liquid				
	Inches (m)	Inches (m)				
MS*092E15MC	3/8" (9.52)	1/4" (6.35)	26 (7.5)	26.25 (8)	66 (20)	0.2 oz/foot (20g/m)
MS*123E15MC	3/8" (9.52)	1/4" (6.35)	26 (7.5)	26.25 (8)	66 (20)	0.2 oz/foot (20g/m)
MS*183E15MC	1/2" (12.7)	1/4" (6.35)	26 (7.5)	33 (10)	82 (25)	0.2 oz/foot (20g/m)
MS*243E15MC	5/8" (15.9)	3/8" (9.52)	26 (7.5)	33 (10)	82 (25)	0.4 oz/foot (40g/m)



CAUTION: Capacity is based on standard length and maximum allowance length is based on reliability. Oil trap should be installed every 16.4 feet - 22.07 feet (5 - 7 meters.)

SERVICE

19 SEER

19 SEER - Torque Wrench Requirements for installation

Outside Diameter		Torque	Torque
mm	Inch	Lbs. per ft.	Kg.m
6.35	1/4	13	1.8
9.52	3/8	30	4.2
12.7	1/2	40	5.5
16.0	5/8	48	6.6

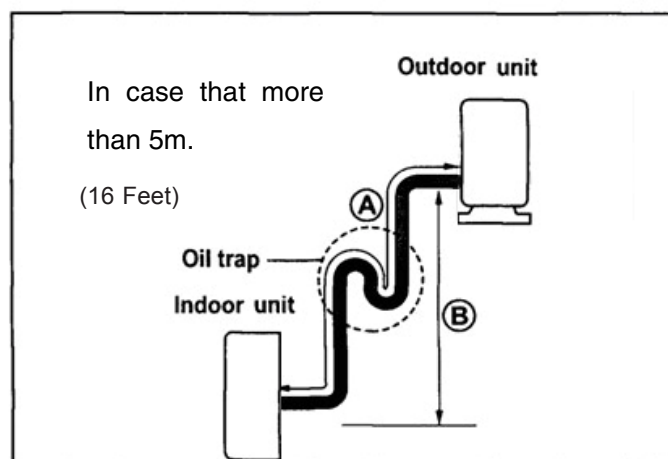
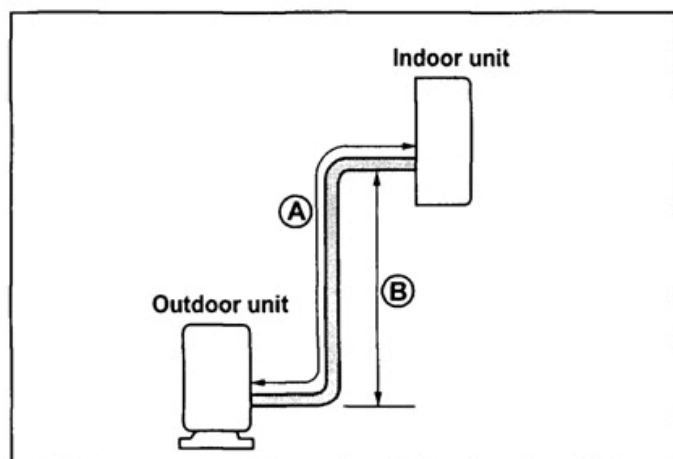
Cable Connections:

The indoor and outdoor unit connection cable should be AWF16# for 9k, 12k, 18k, 24k.

USE COPPER SUPPLY WIRES ONLY.

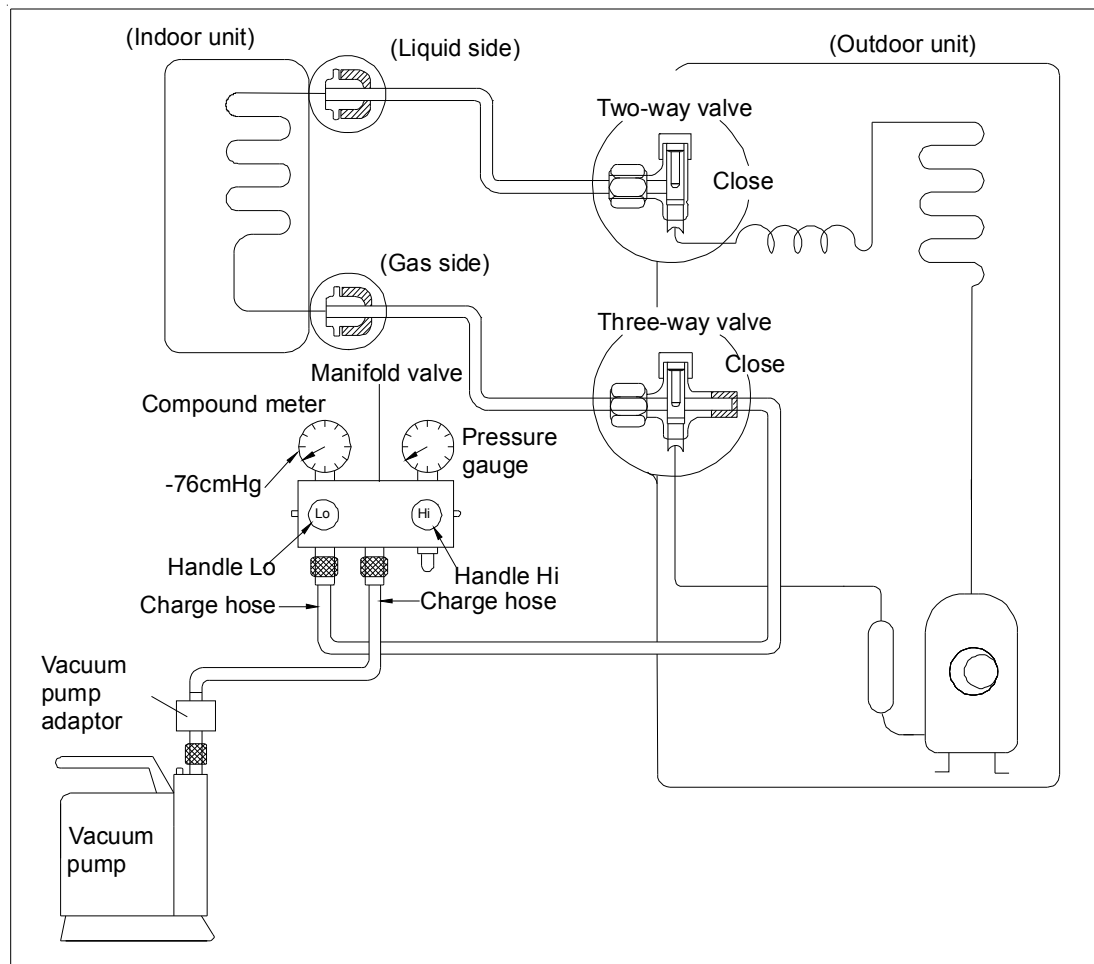
Pipe Length & Elevation Requirements

Model	Pipe Size		Line Set Length Provided with Unit Feet (m)	Max Elevation B Feet (m)	Max. Length Overall A Feet (m)	Additional Refrigerant Per foot of Additional Line Oz. (gram)
	Vapor	Liquid				
	Inches (m)	Inches (m)				
MS*092E19MC	3/8" (9.53)	1/4" (6.35)	16 (5)	16 (5)	33 (10)	0.2 oz/foot (20g/m)
MS*122E19MC	1/2" (12.7)	1/4" (6.35)	16 (5)	16 (5)	33 (10)	0.2 oz/foot (20g/m)
MS*123E19MC	1/2" (12.7)	1/4" (6.35)	16 (5)	16 (5)	33 (10)	0.2 oz/foot (20g/m)
MS*183E19MC	5/8" (12.7)	3/8" (9.53)	16 (5)	26 (8)	49 (15)	0.4 oz/foot (40g/m)
MS*243E19MC	5/8" (12.7)	3/8" (9.53)	16 (5)	33 (10)	66 (20)	0.4 oz/foot (40g/m)



CAUTION: Capacity is based on standard length and maximum allowance length is based on reliability. Oil trap should be installed every 16.4 feet - 22.07 feet (5 - 7 meters.)

Evacuation



WARNING

REFRIGERANT UNDER PRESSURE!

Failure to follow proper procedures may cause property damage, personal injury or death.

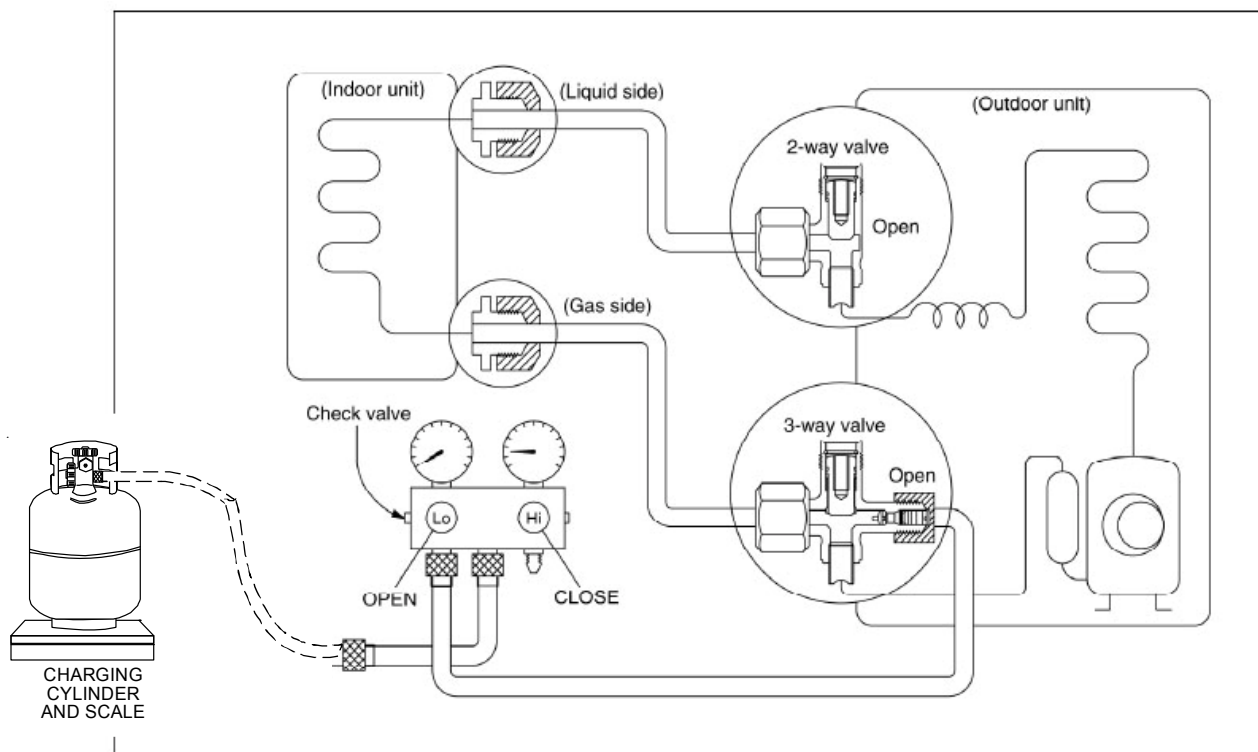
1. Connect the vacuum pump to the gauge manifold's center hose. Connect low pressure gauge hose to gas side of outside unit. Open low side manifold gauge valve only.
2. Evacuate for approximately one hour to 250 microns.

3. Close the valve (low side) on the charge set. Turn off the vacuum pump and make sure the micron gauge does not go above 1,000 microns in approximately 5 minutes after turning off the vacuum pump.
4. Disconnect the charge hose from the vacuum pump.
If the vacuum pump oil becomes dirty or depleted, replenish as needed.

SERVICE

15 SEER & 19 SEER

Gas Charging



WARNING

Refrigerants are heavier than air. They can "push out" the oxygen in your lungs or in any enclosed space. To avoid possible difficulty in breathing or death:

- Never purge refrigerant into an enclosed room or space. By law, all refrigerants must be reclaimed.
- If an indoor leak is suspected, thoroughly ventilate the area before beginning work.
- Liquid refrigerant can be very cold. To avoid possible frostbite or blindness, avoid contact with refrigerant and wear gloves and goggles. If liquid refrigerant does contact your skin or eyes, seek medical help immediately.
- Always follow EPA regulations. Never burn refrigerant, as poisonous gas will be produced.

1. Connect the manifold gauge set center hose to the charging cylinder.

(This hose was disconnected from the vacuum pump.)

2. Purge the air from the air hose.

Open the valve of the refrigerant cylinder and crack open the center manifold gauge hose connection at the manifold gauge set to purge the air. Follow safety procedures above on handling liquid refrigerants.

3. Open the valve (low side) on the manifold gauge set and charge the system with R-410A. R-410A should be charged with liquid only, using a commercial-type metering device in the manifold hose to allow liquid to vaporize.

4. Disconnect the charge hose from the 3-way valve's service port.

Use quick disconnect hoses to ensure refrigerant is not lost during disconnect process.

5. Replace caps to the valve stems and service port.

Using a torque wrench, tighten the service port cap to a torque of 13 lbs. per foot.

Check for gas leaks.



WARNING

REFRIGERANT UNDER PRESSURE!

Failure to follow proper procedures may cause property damage, personal injury or death.

SERVICE

Operational Characteristics

15 SEER & 19 SEER

15 SEER

Temperature /Mode	Cooling Operation	Heating Operation	Drying Operation
Room Temperature	$\geq 63^{\circ}\text{F}$ (17°C)	$\leq 86^{\circ}\text{F}$ (30°C)	$> 50^{\circ}\text{F}$ (10°C)
Outdoor Temperature	$32^{\circ}\text{F} - 122^{\circ}\text{F}$ ($0^{\circ}\text{C} - 50^{\circ}\text{C}$)	$5^{\circ}\text{F} - 70^{\circ}\text{F}$ ($-15^{\circ}\text{C} - 21^{\circ}\text{C}$)	$32^{\circ}\text{F} - 122^{\circ}\text{F}$ ($0^{\circ}\text{C} - 50^{\circ}\text{C}$)

19 SEER

Temperature /Mode	Cooling Operation	Heating Operation	Drying Operation
Room Temperature	$\geq 63^{\circ}\text{F}$ (17°C)	$\leq 86^{\circ}\text{F}$ (30°C)	$> 50^{\circ}\text{F}$ (10°C)
Outdoor Temperature	$32^{\circ}\text{F} - 122^{\circ}\text{F}$ ($0^{\circ}\text{C} - 50^{\circ}\text{C}$)	$5^{\circ}\text{F} - 93^{\circ}\text{F}$ ($-15^{\circ}\text{C} - 34^{\circ}\text{C}$)	$32^{\circ}\text{F} - 122^{\circ}\text{F}$ ($0^{\circ}\text{C} - 50^{\circ}\text{C}$)

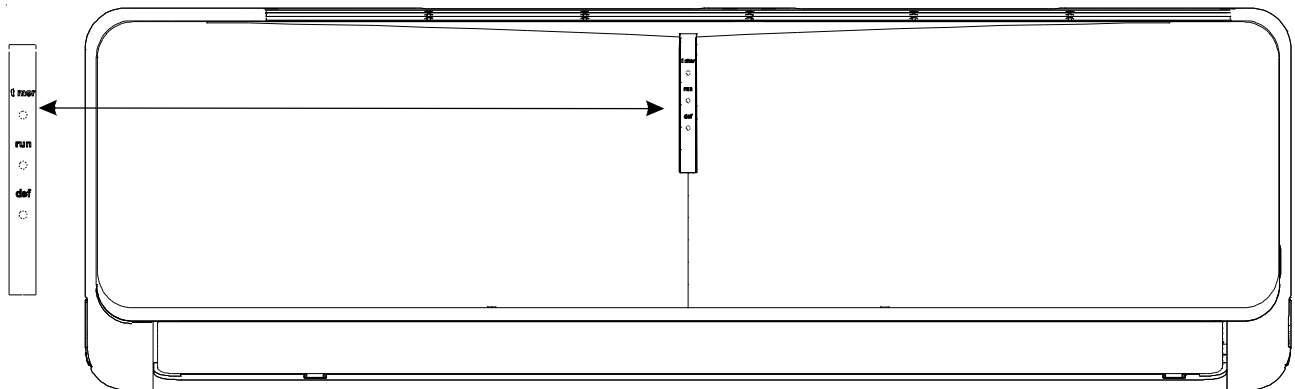
NOTES:

1. If unit is used outside the above ranges, the unit may not function properly.
2. If the room's relative humidity is less than 80%, condensation may occur. By setting the vertical air flow louvers to their maximum angle (vertically to the floor) and setting the FAN mode to HIGH, this problem will be corrected. Optimum performance is achieved within this operating temperature.

Electronic Function Abbreviations

- T1:** Indoor ambient temperature.
- T2:** Tubing temperature of indoor heat exchanger.
- T3:** Tubing temperature of outdoor heat exchanger.
- T4:** Outdoor ambient temperature.
- T5:** Compressor discharge temperature.

Display Function:



t mer 	TIMER indicator This indicator illuminates when TIMER is set ON/OFF.
run 	OPERATION indication lamp: Flashes at 0.5Hz when the unit is in standby. Illuminate when the unit is turned on
def 	DEFROST indicator This indicator illuminates when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating mode

SERVICE

15 SEER

Main Protection

3 MINUTE COMPRESSOR DELAY AT RESTART

The compressor delays for 1 minute at the initial start-up of the unit. For subsequent start-ups, the compressor delays for 3 minutes.

COMPRESSOR TOP PROTECTION

The unit will cease operation when the compressor top temperature protector turns off and will restart after the compressor top temperature protector resets.

TEMPERATURE PROTECTION OF COMPRESSOR DISCHARGE

As the compressor discharge temperature increases, the running frequency is limited by the following:

1. If the compressor discharge temperature is $T_5 > 239^\circ\text{F}$ (115°C) for 5 seconds, the compressor stops.
2. When the temperature is 226°F (108°C) $< T_5 < 239^\circ\text{F}$ (115°C), the frequency decreases to the lower level every 3 minutes.
3. 194°F (90°C) $< T_5 < 221^\circ\text{F}$ (105°C), the unit continues to run at the current frequency.
4. $T_5 < 194^\circ\text{F}$ (90°C): there is not limit for frequency.

FAN SPEED IS OUT OF CONTROL

When the indoor fan speed remains under 300 RPM for a certain time period, the unit will stop and the LED will display the failure code.

INVERTER MODULE PROTECTION

The inverter protection feature protects the operation of the current, voltage and temperature of the unit. If the pre-set conditions of the module protection are exceeded, the corresponding code will be displayed on the indoor unit and the unit will cease operation.

INDOOR FAN DELAYED OPEN FUNCTION

When the unit is turned on, the louver will activate immediately and the indoor fan will open 10 seconds later. If the unit is in heating mode, the indoor fan is also controlled by the anti-cold wind function.

COMPRESSOR PRE-HEATING FUNCTION

The compressor will pre-heat if the following conditions are present (the compressor heating cable will activate):

1. If T_4 (outdoor ambient temperature) is $< 37^\circ\text{F}$ (3°C).
2. The unit has just be connected to a power supply, or if $T_4 < 37^\circ\text{F}$ (3°C).
3. The compressor has been inactive over 3 hours

Pre-Heating Mode

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

Pre-Heating Release Condition:

If $T_4 > 41^\circ\text{F}$ (5°C) is present or the compressor begins operation, the pre-heating function will stop.

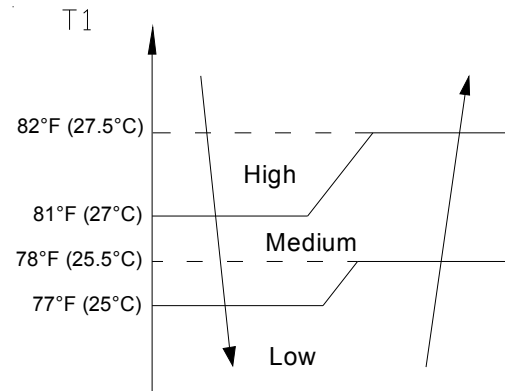
ZERO CROSSING DETECTION ERROR PROTECTION

If the air conditioning unit detects an incorrect time interval for 240 seconds continuously, the unit will stop and the LED will display the failure. The correct zero crossing signal time interval should be between 6-13ms.

Operation Modes & Functions

FAN MODE

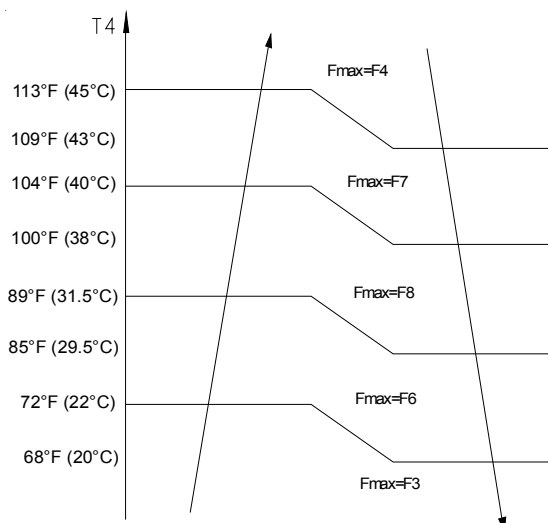
1. Outdoor fan and compressor stop.
2. Temperature setting function is disabled and not setting temperature is displayed.
3. The indoor fan can be set to High, Med., Low and Auto.
4. The louver operates the same as in the cooling mode.
5. Auto fan.



COOLING MODE

Compressor Running Rules

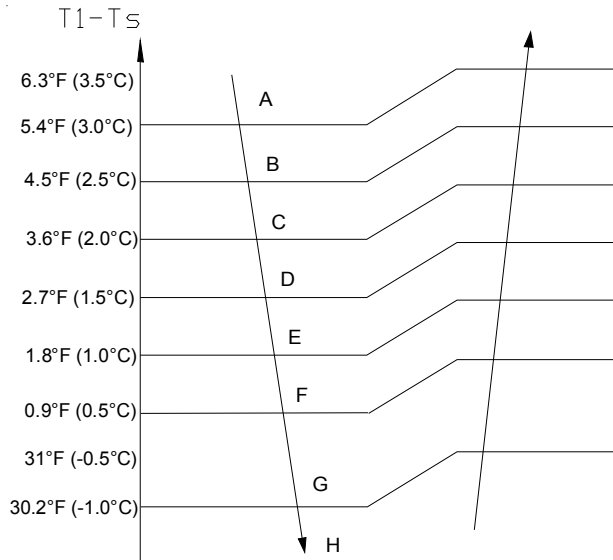
The maximum operation frequency of the compressor after starting is as follows:



SERVICE

15 SEER

If the air conditioner is turned on by remote control, the compressor will run at the Fmax frequency for 7 minutes, according to the outdoor ambient temperature. During those 7 minutes, the frequency limitation is active. After the 7 minutes, the compressor running frequency will be controlled as follows:



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

NOTE: When $T_1 - T_s$ keep the same temperature zone for 3 minutes, the compressor will run as follows:

- A-E: Increases the frequency to the higher level until F8 is reached.
- F: Keeps the current frequency.
- G: Decreases the frequency to the lower level until F1 is reached.
- H: Runs at F1 for 1 hour (if $T_1 - T_s < 36°F [2°C]$) is reached, the compressor will stop

During this time, the compressor running frequency is limited by the current.

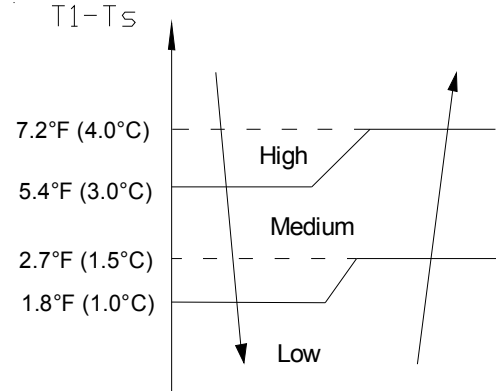
- OFF: Compressor stops
- DECREASE: Decreases the running frequency to the lower level.
- HOLD: Keeps the current frequency.
- RESUME: No frequency limitation.

NOTE: When the air conditioner is in "HOLD" zone for 3 minutes, the compressor frequency will rise to the next higher level (frequency will increase a maximum of 2 times).

INDOOR FAN RUNNING REQUIREMENTS

In cooling mode, the indoor fan runs continuously and High, Med., Low and Auto speeds can be selected.

In cooling mode, the Auto fan feature is as follows:



CONDENSER TEMPERATURE PROTECTION

- At $131°F (55°C) < T_3 < 140°F (60°C)$, the compressor frequency will decrease to the lower level until F1 is reached. It then runs at F1. If $T_3 < 129°F (54°C)$ is reached, the compressor will continue to run at the current frequency.
- At $T_3 < 126°F (52°C)$, the compressor will not limit the frequency and will resume operation at the former frequency.
- At $T_3 > 140°F (60°C)$ for 5 seconds, the compressor will stop until $T_3 < 126°F (52°C)$ is reached.

EVAPORATOR TEMPERATURE PROTECTION

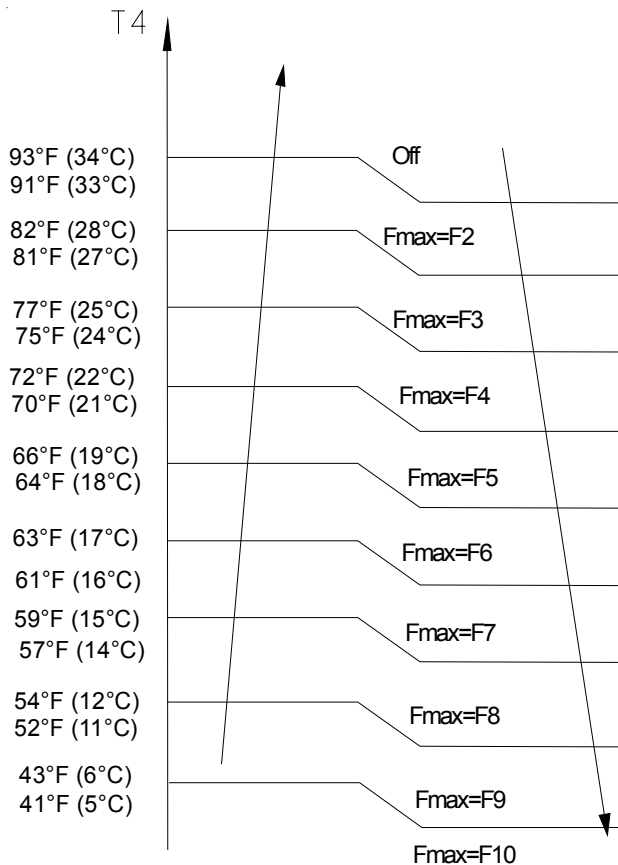
- At $T_2 < 32°F (0°C)$, the compressor will stop running and will restart at $T_2 \geq 26°F (52°C)$.
- At $0°C \leq T_2 < 39°F (4°C)$, the compressor frequency is limited and decreased to the lower level.
- At $4°C \leq T_2 \leq 45°F (7°C)$, the compressor will maintain the current frequency.
- At $T_2 > 45°F (7°C)$, the compressor frequency is not limited.

SERVICE

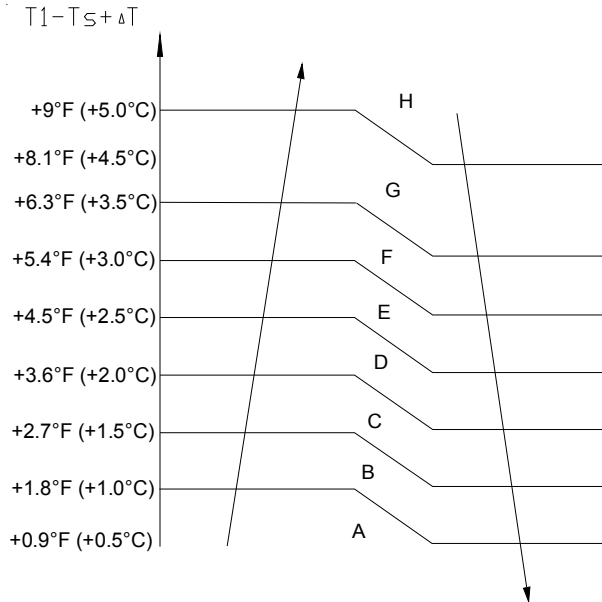
HEATING MODE

Compressor running rules

After starting, the maximum operation frequency of the compressor adheres to the following:



If the air conditioning is turned on by the remote control, the compressor will run at the Fmax frequency for 7 minutes, according to the outdoor ambient temperature. During those 7 minutes, the frequency limitation is active. After the 7 minutes, the compressor running frequency will be controlled as follows:



While the zones A, B and C... are corresponding to different compressor running frequency. $\Delta T=32^{\circ}\text{F}$ (0°C) is the default.

NOTE: When T1-Ts keep the same temperature zone for 3 minutes, the compressor will run as follows:

- A-E: Increases the frequency to the higher level until F10 is reached.
- F: Keeps the current frequency.
- G: Decreases the frequency to the lower level until F1 is reached.
- H: Runs at F1 for 1 hour (if $T1-Ts-\Delta T>43^{\circ}\text{F}$ [6°C] is reached, the compressor will stop).

During this time, the compressor running frequency is limited by the current.

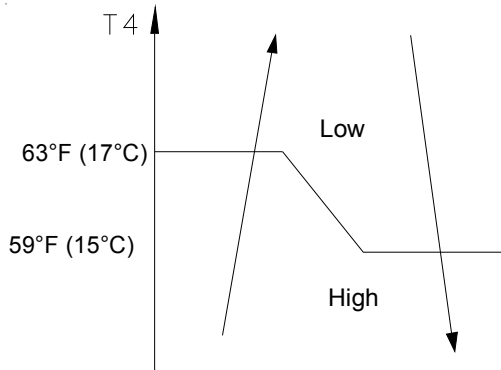
- OFF: Compressor stops
- DECREASE: Decreases the running frequency to the lower level.
- HOLD: Keeps the current frequency.
- RESUME: No frequency limitation.

NOTE: When the air conditioner is in "HOLD" zone for 3 minutes, the compressor frequency will rise to the next higher level (frequency will increase a maximum of 2 times).

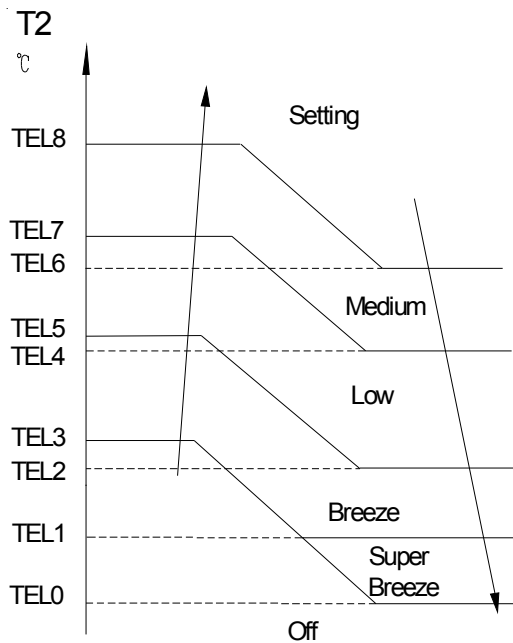
SERVICE

15 SEER

OUTDOOR FAN RUNNING REQUIREMENTS



INDOOR FAN RUNNING REQUIREMENTS

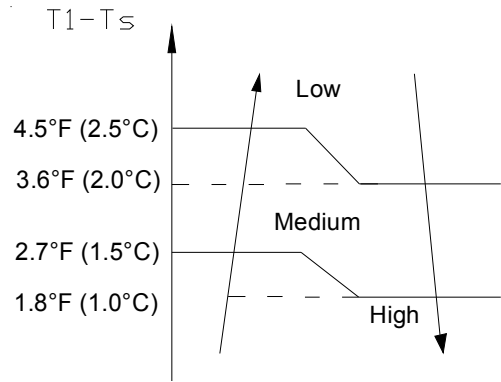


If the compressor stops (caused by the room temperature rising), the indoor fan will be forced to run 127 seconds with breeze. During this period, the anti-cold wind is disabled.

If the units 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 may be set as High, Med., Low or Auto Fan and the anti-cold wind function is preferential.

Auto fan action in heating mode:



DEFROSTING MODE

Defrost conditions (beginning):

T4>0°C: When the unit is running, if the following two items are satisfied, the unit will begin defrosting.

1. The units run with $T3 < 37^{\circ}\text{F}$ (3°C) for 40 minutes and $T3$ remains lower than $\text{TCD}34^{\circ}\text{F}$ (1°C) for more than 3 minutes.
2. The units run with $T3 < 37^{\circ}\text{F}$ (3°C) for 80 minutes and $T3$ remains lower than $\text{TCDI}+36^{\circ}\text{F}$ (2°C) for more than 3 minutes.

T4>32°F (0°C): If the first and second conditions are satisfied, the program judges if $T2$ has decreased more than 41°F (5°C). When $T2$ has decreased more than 41°F (5°C), the unit will enter Defrost mode.

NOTE: Regardless of the value of $T2$, if the unit runs with $T3 < 37^{\circ}\text{F}$ (3°C) for more than 120 minutes and $T3$ remains lower than $\text{TCDI}+39^{\circ}\text{F}$ (4°C) for more than 3 minutes, the unit will enter Defrost mode (this applies even if $T2$ drops more than 41°F (5°C)).

Defrost conditions (ending):

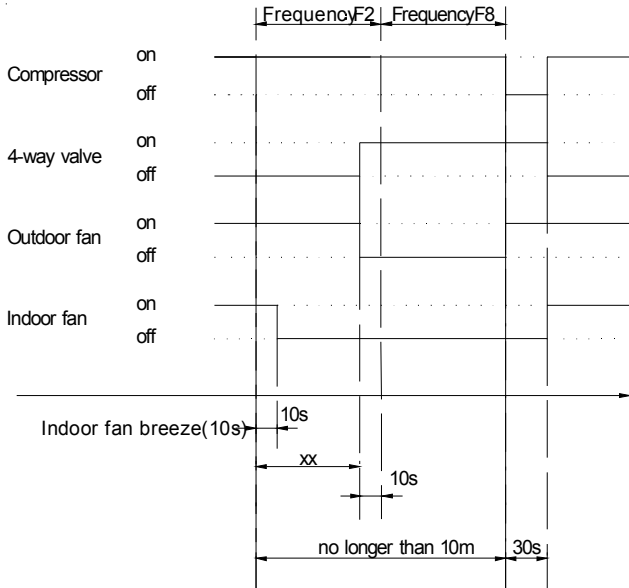
If any one of the following items is satisfied, the Defrost mode will end and the unit will return to normal heating mode.

1. $T3$ rises higher than $\text{TCDE}34^{\circ}\text{F}$ (1°C).
2. $T3$ remains higher than $\text{TCDE}36^{\circ}\text{F}$ (2°C) for 80 seconds.
3. The unit has run for 10 minutes in Defrost mode.

SERVICE

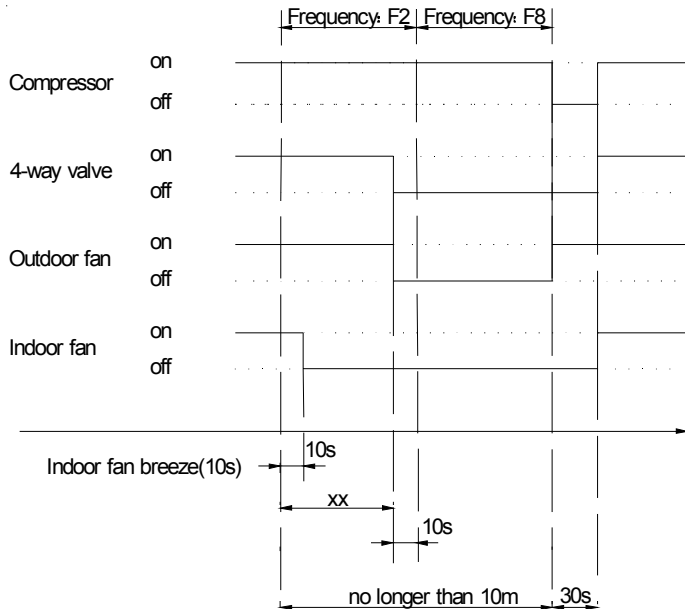
Defrost action:

For 9k, 12k models:



XX=60.

For 18k, 22k models:



XX = 60 for 18k models; XX = 90 for 22k models.

15 SEER

EVAPORATOR COIL TEMPERATURE PROTECTION

1. $T_2 > TEH36^\circ (2^\circ C)$, the compressor running frequency decreases to the lower level and the unit runs for 20 seconds. When the frequency decreases to F2 and the T_2 remains over $TEH36^\circ (2^\circ C)$ for 3 minutes, the compressor will stop.
2. $T_2 < 118^\circ F (48^\circ C)$ or T_2 remains on $118^\circ F (48^\circ C) \sim TEH36^\circ (2^\circ C)$ for 6 minutes, the frequency will not be limited by T_2 .
3. $T_2 > 140^\circ F (60^\circ C)$, the compressor will stop and restart when $T_2 < 118^\circ F (48^\circ C)$.

AUTO MODE

Auto mode can be selected with the remote control and the setting temperature can be changed between $63^\circ F - 86^\circ F (17^\circ C - 30^\circ C)$.

In Auto mode, the unit still choose Cooling, Heating or Fan-only mode, according to $\Delta T (\Delta T + T_1 - T_s)$.

$T = T_1 - T_s \Delta$	Running mode
$\Delta T \geq 34^\circ F (1^\circ C)$	Cooling
$-1 < \Delta T \leq 34^\circ F (1^\circ C)$	Fan-only
$\Delta T < 34^\circ F (1^\circ C)$	Heating

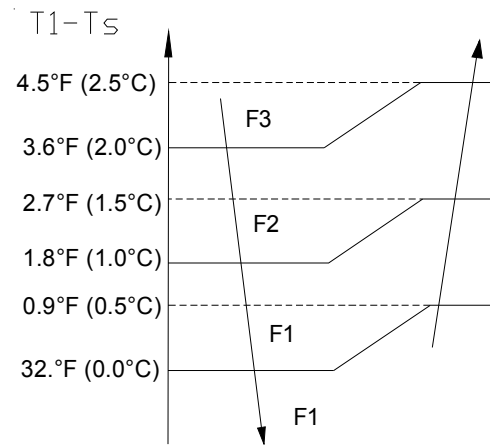
Indoor fan will run at Auto fan of the relevant mode.

The louver operates the same as in relevant mode.

If the unit switches modes between heating and cooling, the compressor will stop every 15 seconds and then choose the mode according to $T_1 - T_s$. If the setting temperature is modified, the unit will choose the running function again.

DRYING MODE

During Drying mode, the indoor fan speed is fixed at breeze and cannot be changed, the louver angle is the same as in cooling mode and the compressor rules are as follows:



SERVICE

15 SEER

LOW INDOOR ROOM TEMPERATURE PROTECTION

During Drying mode, if the room temperature is lower than 50°F (10°C), the compressor will stop and will not resume until the room temperature exceeds 54°F (12°C).

EVAPORATOR ANTI-FREEZING PROTECTION, CONDENSER HIGH TEMPERATURE PROTECTION AND OUT-DOOR UNIT FREQUENCY LIMIT.

These protection features are active and the same as in Cooling mode.

ENTERING FORCE OPERATION FUNCTION

When the unit is OFF, pressing the touch button will engage the unit to forced Auto mode. Pressing the button again within 5 seconds will start forced Cooling mode. In forced Auto, forced Cooling or any other operation mode, pressing the touch button will turn off the unit.

In forced operation mode, all general protections and the remote control are available.

OPERATION RULES

Forced Cooling Mode:

The compressor runs at F2 frequency and the indoor fan runs as breeze. After running for 30 minutes, the unit will cycle into Auto mode at 75°F (24°C) setting temperature.

Forced Auto Mode:

The action of the forced Auto mode is the same as normal Auto mode with 75°F (24°C) as the setting temperature.

TIMER FUNCTION

The timing range is 24 hours.

TIMER ON: The unit will turn on automatically when the set time is reached.

TIMER OFF: The unit will turn off automatically when the set time is reached.

TIMER ON/OFF: The unit will turn on automatically when the set ON time is reached and will automatically turn off when the set OFF time is reached.

TIMER OFF/ON: The unit will turn off automatically when the set OFF time is reached and will automatically turn ON when the set ON time is reached.

The timer functions will not change the air conditioner's current operation mode. Example: If the AC is off, it will not start up after setting the TIMER OFF function and when reaching the set time, the timer LED will be off and the air conditioner's running mode will not have changed.

The set time is relative time.

SLEEP FUNCTION MODE

Operation time in Sleep mode is 7 hours. After the 7 hours, the unit stops this mode and turns off.

Sleep Mode Operation Process

When cooling, the set temperature rises 34°F (1°C) (be lower than 86°F [30°C]) every hour. After 2 hours, the set temperature stops rising and the indoor fan is fixed at low speed.

When heating, the set temperature decreases 34°F (1°C) (be higher than 63°F (17°C)) every hour. After 2 hours, the set temperature stops rising and the indoor fan is fixed at low speed (anti-cold wind function has priority).

Timer setting is available

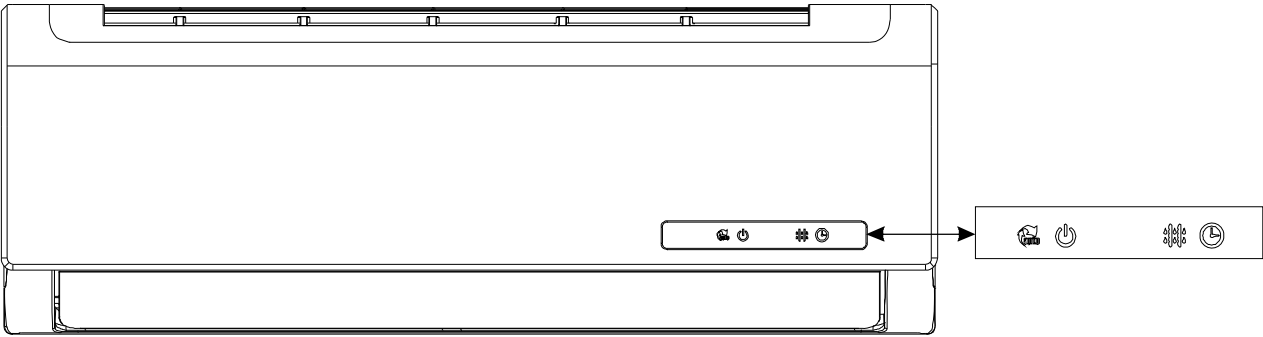
When using TIMER OFF function during sleep mode (or sleep function in TIMER OFF mode), if the set time is less than 7 hours, the sleep function will be cancelled when the set time is reached. If the timing is more than 7 hours, the unit will not stop unit it reaches the set time in Sleep mode.

AUTO RESTART FUNCTION

The indoor unit is equipped with an Auto-Restart function, which is carried out through an Auto-Restart module. In the event of a sudden power failure, the module memorizes the setting conditions before the power failure. The unit will automatically resume the previous operation setting (not including swing function) after 3 minutes when the power is restored.

If the memorization condition is forced in Cooling mode, the unit will run in Cooling mode for 30 minutes and turn to Auto mode as 75°F (24°C) being the set temperature.

If the air conditioner is off before a power outage (and the air conditioning is needed for start up), the compressor will have a 1 minute delay when power is restored. In conditions other than a power outage, the compressor will have a 3 minute delay upon restarting.



	OPERATION indication lamp: This lamp illuminates when the air conditioner is in operation.
	TIMER indication lamp: Lights up during Timer operation.
	DEFROST indication lamp (For cooling & heating models only): Lights up when the air conditioner starts defrosting automatically or when the warm air control feature is activated in heating operation.
	DIGITAL DISPLAY: Displays the current setting temperature and malfunction/protection code when the air conditioner is in operation.

Protection Features

The following features protect the reliability and life of the unit and compressor:

1. 3 minute delay for restarting the compressor. NOTE: initial startup has a 1 minute delay only; subsequent delays are all 3 minutes.
2. Open circuit sensor protection.
3. Fan speed sensor (if indoor fan speed is too low or too high, the unit will shut down).
4. Start protection (if the compressor attempts to start four times within 5 minutes, the unit will shut down, and LCD displays the failure information).
5. Overcurrent protection of the compressor.

Fan Only Operation

Fan speed will cycle between HIGH, MED, LOW and AUTO when pressing the "FAN SPEED" button on the remote control.

Cooling Mode Operation

For heat pump models, the reversing valve is de-energized in the cooling mode.

Upon a call for cooling (indoor room temperature rises about 1.8°F (1.0°C) more than set point):

- the compressor, outdoor fan and low speed indoor fan will turn on
- if the indoor temperature is about 7.2°F (4.0°C) more than set point, medium speed indoor fan will turn on.
- if the indoor temperature is about 9.0°F (5.0°C) more than set point, high speed indoor fan will turn on.

If the indoor coil temperature drops too low, the compressor and outdoor fan will turn off and the indoor fan will continue to run until the indoor coil temperature rises to a predetermined temperature (5 minutes minimum).

For heat pump models, if the outdoor coil temperature gets too high, the compressor and outdoor fan will turn off until the outdoor coil temperature drops to a predetermined temperature (5 minutes minimum).

Dehumidifying Mode Operation

For extra dehumidification, the indoor fan will run on low speed. Indoor coil temperature protection is provided the same as in the cooling mode.

Heating Mode Operation

For heat pump models, the reversing valve is energized in the heating mode (except when defrosting).

Upon a call for heating (indoor room temperature drops about 1.8°F (1.0°C) more than set point):

- the compressor and outdoor fan will turn on
- the indoor fan will delay on for short period, then will ramp up to the selected fan speed to reduce "cold-blow".
- When in the heating mode, the compressor will run for a minimum of 7 minutes.

If the indoor coil temperature rises too much, the compressor and fans will turn off.

NOTE: Reversing valve is powered in heat mode.

Defrost Mode Operation

Defrost will be initiated when:

1. outdoor coil temperature stays less than 30°F (-1°C) for more than 3 minutes, or
2. outdoor coil temperature is less than 32°F (0°C) for 90 minutes of heating operation

Defrost will be terminated when:

1. outdoor coil temperature rises to 68°F (20°C) or more
2. defrost time reaches 10 minutes

During defrost, the compressor and outdoor fan initially turn off, then after 10 seconds the indoor fan turns off, the reversing valve will shift, then 5 seconds later the compressor will turn back on. Near the end of the defrost cycle, the compressor will shut off for 25 seconds (when the compressor shuts off the outdoor fan will turn on), then just before the compressor turns back on, the reversing valve will shift back into the heating mode, and the compressor will turn back on. The indoor fan will turn back on when the indoor coil reaches a predetermined temperature.

Automatic Changeover Mode Operation

- If the room temperature is about 1.8°F (1.0°C) below the set point, then the unit will turn on in the heating mode.
- If the room temperature is about 1.8-3.6°F (1.0-2.0°C) above the set point, then the unit will turn on in the cooling mode.
- If the room temperature is close to set point, then unit will run in the fan only mode.
- Once the unit comes on in one mode of operation, it will not turn to the other mode of operation for at least 15 minutes.
- The motion of the directional louvers should be set appropriately for the operational mode (the direction of the louvers do not change automatically with the change in operation mode).

Forced Cooling Operation

Continuous cooling operation can be forced by selecting the FORCED COOLING button or switch. The unit will operate for 30 minutes continuously in the cooling mode, regardless of the indoor temperature. After 30 minutes the set point becomes 75°F (24°C) and the unit operates in the Dehumidifying Mode. Note that all protections from the Cooling Mode and Dehumidifying Mode apply.

Forced Automatic Operation

Forced automatic operation can be forced by selecting the FORCED AUTO button or switch. The temperature set point will be 75°F (24°C).

Operation can be changed from Remote Mode to Forced Auto to Forced Cooling (then back to Remote Mode) by button selection on the remote.

Sleep Mode Operation

Sleep mode function is available for cooling, heating or automatic modes.

The set point temperature will rise (when cooling) or drop (when heating) about 1.8°F (1.0°C) per hour for 2 hours, then the air circulation of low speed indoor fan will turn on. After 7 hours total, then unit will turn off.

Auto Restart Function

In the event of a sudden power failure, the unit is programmed to return to the previous settings before the power failure.

Turbo Mode

For 12K models only, the indoor fan will operate in HIGH speed when the "TURBO" button on the remote is pressed. The unit will return to normal speed when "TURBO" button is pressed again. (TURBO MODE will be cancelled if the operation mode is changed, Forced Cooling mode is selected, or the unit is turned off). NOTE: SLEEP MODE is not available while in TURBO MODE.

Display Board

"OPERATION" indicator flashes once every second after power is on and is turned on continuously when the air conditioner is in operation.

"TIMER" indicator turns on when the TIMER is set to ON.

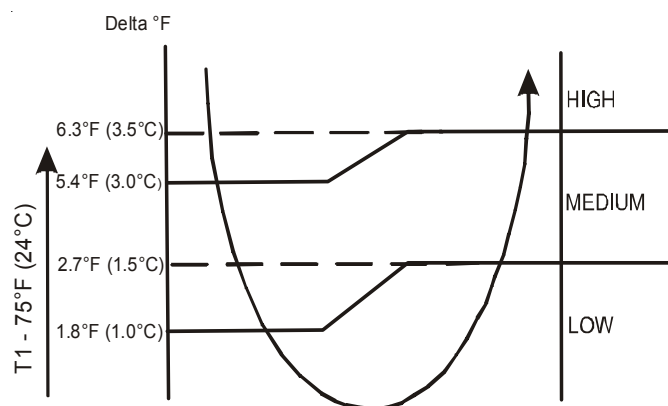
If the outdoor unit starts defrosting "PRE-DEF" indicator is turned on.

"AUTO" indicator is turned on when Automatic Mode is selected (18K & 24K models only).

Operation Modes & Functions

FAN MODE

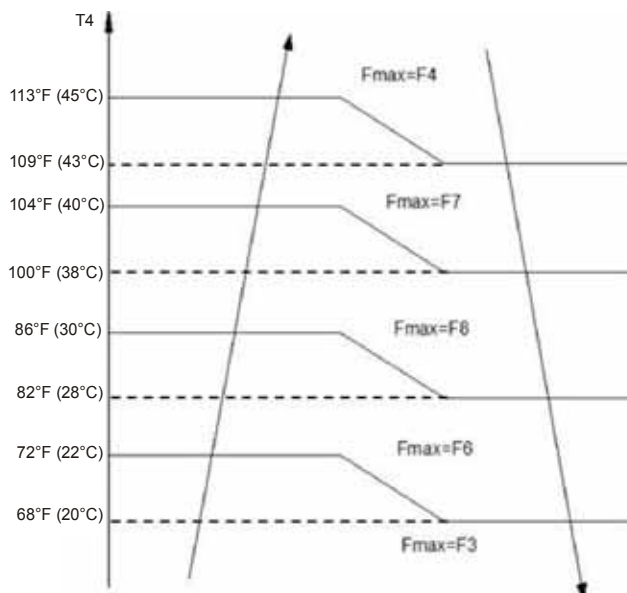
1. Outdoor fan and compressor stop.
2. Temperature setting function is disabled.
3. The indoor fan and compressor stop.
4. The louver operates the same as in the cooling mode.
5. Auto-Fan operation in is the same in both Fan-Only mode and Cooling mode with 24 hour setting temperature.



COOLING MODE

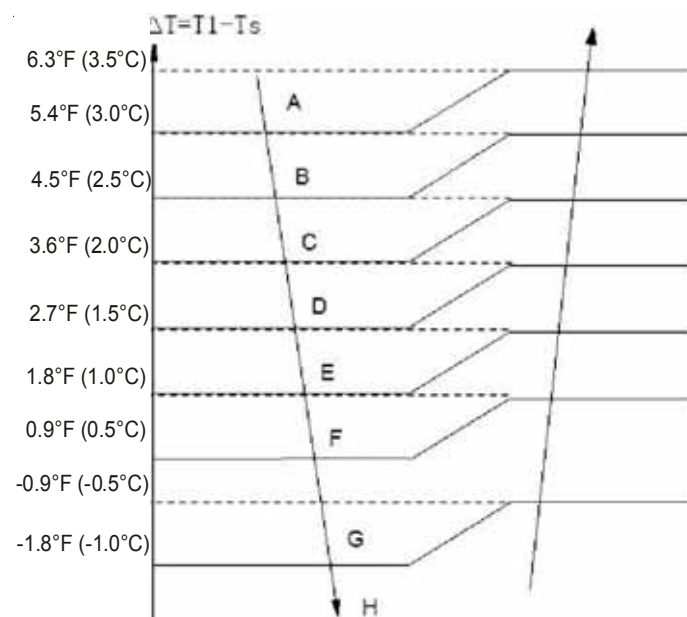
Compressor operation:

The operational frequency of the compressor after starting is as follows:



After the air conditioner is started by the remote control (or by turning on the air conditioner after turning it off by the remote control), the compressor will run at the maximum frequency (F_{max}) for seven (7) minutes according to the outdoor ambient temperature. During that seven (7) minutes, the frequency limitation is active.

After the seven (7) minute run time, the compressor operating frequency will be controlled as shown below:



Ts - Set Point Temperature

Temperature Zone	A	B	C	D	E	F	G	H
Frequency	F8	F8	F7	F6	F5	F3	F1	F0

NOTE: When $\Delta T = T1 - Ts$ remains in the same temperature zone for 3 minutes, the compressor will run as below:

A-E: Increases the frequency to the higher level until F8 is reached.

F: Keeps the current frequency.

G: Decreases the frequency to the lower level until F1 is reached.

H: Runs at F1 for 1 hour. (If $T1 - Ts < -2$, the compressor will stop.)

SERVICE

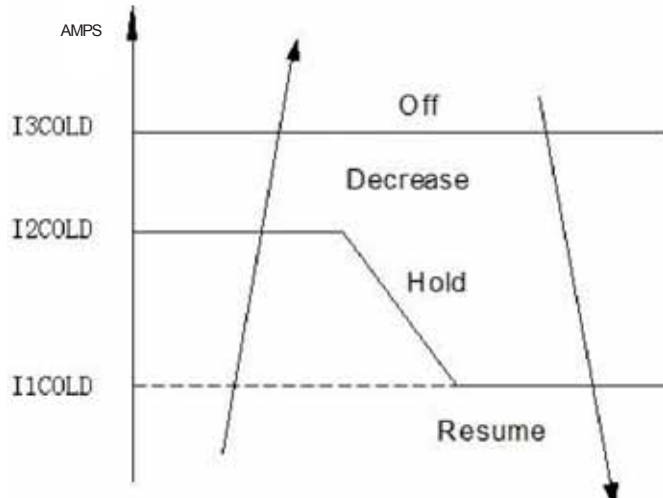
19 SEER

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

INDOOR FAN OPERATION

In cooling mode, the indoor fan runs continuously and the speed can be selected for HIGH, MEDIUM, LOW and AUTO.

While in cooling mode, the AUTO FAN operates as follows:



OFF: Compressor stops.

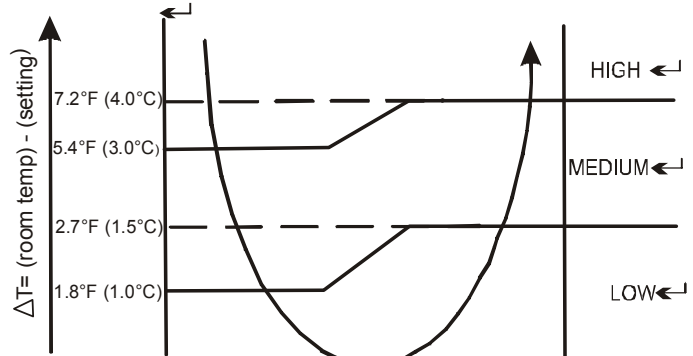
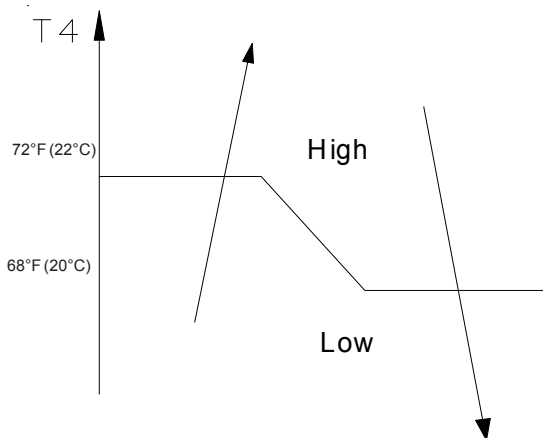
DECREASE: Running frequency decreased to lower level.

HOLD: Keeps the current frequency.

RESUME: No limitation for frequency.

NOTE: When the unit is in "HOLD" zone for 3 minutes, the compressor frequency will rise to the higher level. (Frequency increases no more than twice.)

OUTDOOR FAN OPERATION



CONDENSER HIGH TEMPERATURE T3 PROTECTION:

When 140°F (60°C) $< T_3 < 131^{\circ}\text{F}$ (55°C), the compressor frequency will decrease to the lower level until F1 is reached and then will operate at F1.

When $T_3 < 129^{\circ}\text{F}$ (54°C), the compressor will keep running at the current frequency.

When $T_3 < 126^{\circ}\text{F}$ (52°C), the compressor will not limit the frequency again and it will resume operation at the former frequency.

When $T_3 > 140^{\circ}\text{F}$ (60°C) for 5 seconds, the compressor will stop until $T_3 < 126^{\circ}\text{F}$ (52°C) is reached.

EVAPORATOR LOW TEMPERATURE T2 PROTECTION:

When $T_2 < 32^{\circ}\text{F}$ (0°C), The compressor will stop and restart when $T_2 > 41^{\circ}\text{F}$ (5°C) is reached.

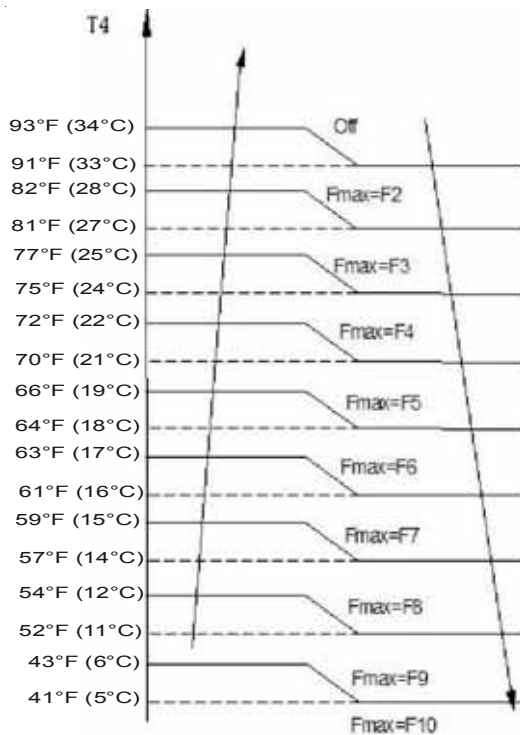
When 32°F (0°C) $< T_2 < 39^{\circ}\text{F}$ (4°C), the compressor frequency will be limited. Decrease the frequency to the lower level every minute until it stops.

When 39°F (4°C) $\leq T_2 \leq 45^{\circ}\text{F}$ (7°C), the compressor will operate in the current frequency.

When $T_2 > 45^{\circ}\text{F}$ (7°C), the compressor frequency will not be limited.

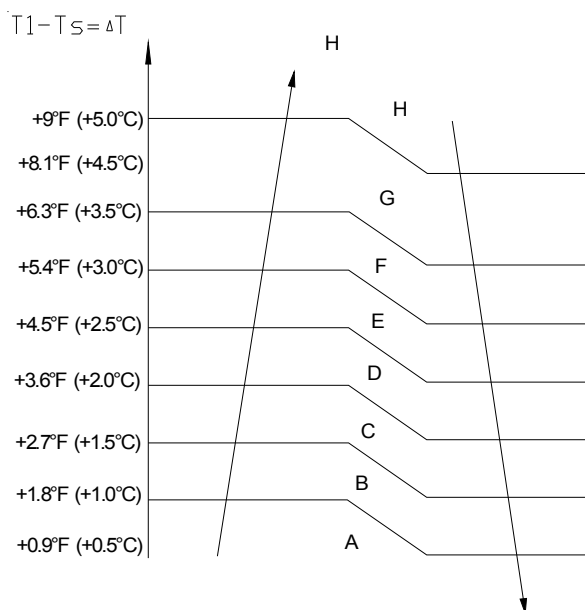
HEATING MODE: Compressor running operation

The operation frequency of the compressor after starting is as follows:



After the air conditioner starts, the compressor will run at the Fmax frequency for seven (7) minutes, according to the outdoor ambient temperature. During those 7 minutes, frequency limitation is available.

After those 7 minutes, the compressor operating frequency will be as follows:



Temperature Zone	A	B	C	D	E	F	G	H
Frequency	F10	F9	F8	F7	F5	F3	F1	F0

NOTE: $\Delta T = 0$ is the factory setting.

NOTE: When T1-Ts remains in the same temperature zone for 3 minutes, the compressor will operate as below:

A-E: Increases the frequency to the higher level until F10 is reached.

F: Keeps the current frequency.

G: Decreases the frequency to the lower level until F1 is reached.

H: Runs at F1 for 1 hour. (If T1 -Ts- $\Delta T > 11^{\circ}\text{F}$ (6°C), the compressor will stop.)

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

OFF: Compressor stops.

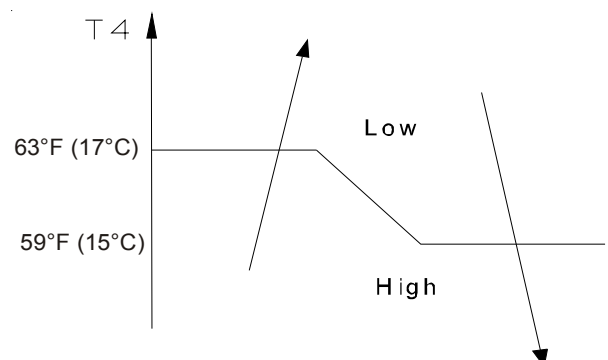
DECREASE: Running frequency decreased to lower level.

HOLD: Keeps the current frequency.

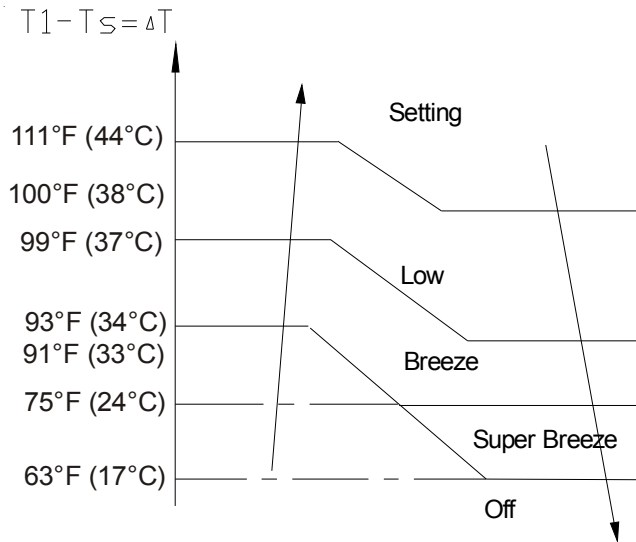
RESUME: No limitation for frequency.

NOTE: When the air conditioner is in "HOLD" zone for 3 minutes, the compressor frequency will rise to the higher level. (Frequency increases no more than twice.)

OUTDOOR FAN OPERATION:



INDOOR FAN OPERATION:



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

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

Indoor fan speed can be set as HIGH, MEDIUM, LOW or AUTO grade, but anti-cold wind function is preferred.

Auto fan action occurs in heating mode.

DEFROST MODE:

Defrosting Conditions:

Condition 1: If $T4 > 32^\circ\text{F}$ (0°C).

When the units are running, the units begin defrosting when the following two items are satisfied:

1. The units run with $T3 < 37^\circ\text{F}$ (3°C) for 40 minutes and $T3$ remains lower than 21°F (-6°C) for more than 3 minutes.
2. The units run with $T3 < 37^\circ\text{F}$ (3°C) for 80 minutes and $T3$ remains lower than 25°F (-4°C) for more than 3 minutes.

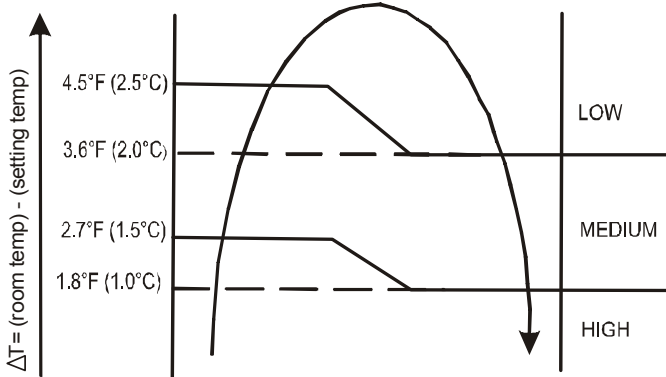
Condition 2: If $T4 > 32^\circ\text{F}$ (0°C).

If both condition 1 and condition 2 are satisfied, the unit recognizes $T2$ has decreased more than 9°F (5°C) and when it has, the unit will enter DEFROST mode.

Condition 3: Regardless of the value of $T4$, if the unit runs with $T3 < 37^\circ\text{F}$ (3°C) for more than 120 minutes (and $T3$ remains lower than 25°F (-4°C) for more than 3 minutes). If $T2$ drops more than 9°F (5°C), the unit will still operate in DEFROST mode.

Condition of ending DEFROST: If any of the following items is satisfied, defrosting will end and the unit will return to normal heating mode.

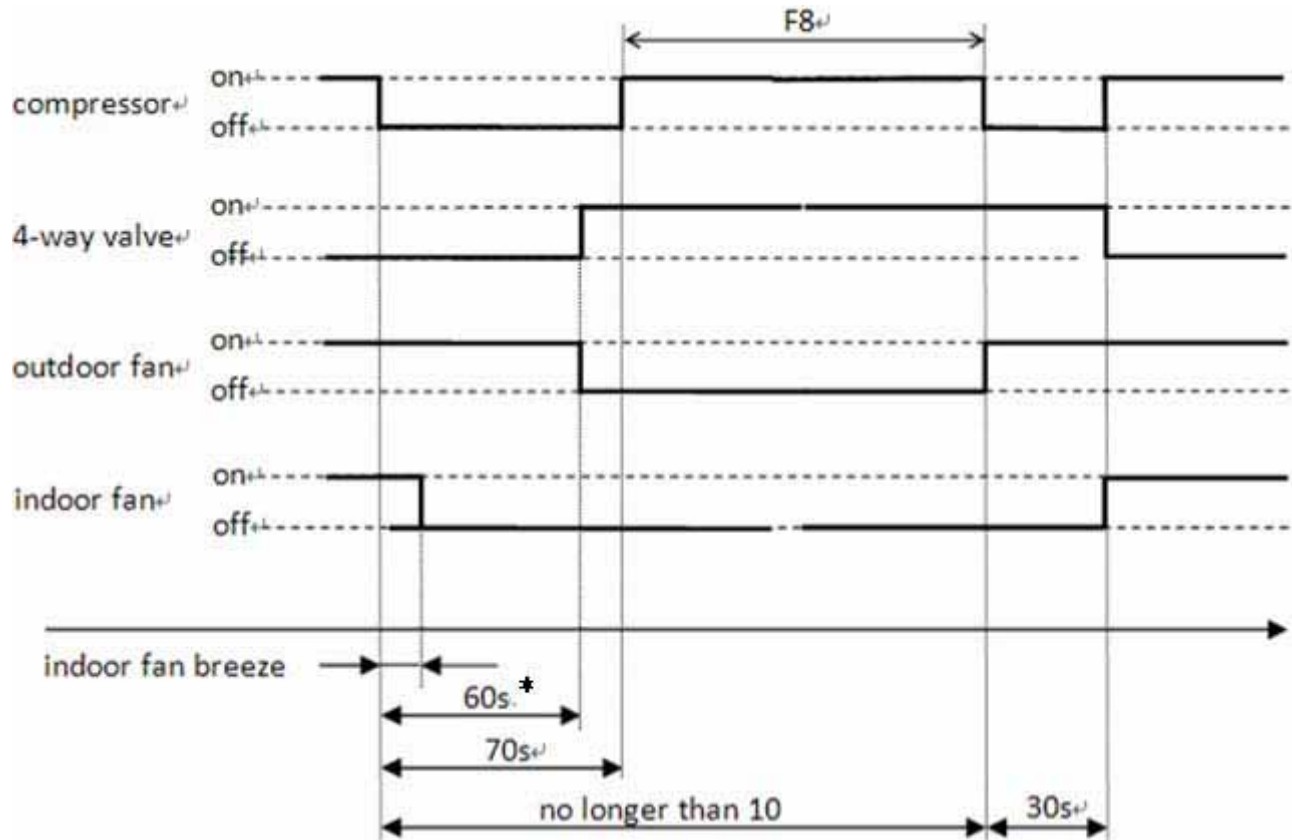
1. $T3$ rises higher than $TCDE1^\circ$.
2. $T3$ rises higher than 127°F (53°C) and remains at that temperature for 80 seconds.
3. The unit has operated for 10 minutes in DEFROST mode.



SERVICE

19 SEER

Defrosting Action:



HIGH EVAPORATOR COIL TEMPERATURE T2 PROTECTION:

1. $T_2 > 127^\circ\text{F}$ (53°C): The compressor's running frequency decreased to the lower level and runs for 20 seconds. When the frequency decreased to F2 and T_2 exceeds 127°F (53°C) for 3 minutes, the compressor will stop.
2. If $T_2 < 118^\circ\text{F}$ (48°C) or T_2 remains in 18°F (48°C)- 127°F (53°C) for 6 minutes, the frequency will not be limited by T_2 .
3. If $T_2 > 140^\circ\text{F}$ (60°C), the compressor will stop and restart when $T_2 < 118^\circ\text{F}$ (48°C).

AUTOMODE:

This mode can be chosen with the remote control and the setting temperature can be changed between 30.6°F (17°C)- 56°F (30°C). In AUTOMODE, the unit will choose COOLING, HEATING or FAN-ONLY modes, according to ΔT ($\Delta T = T_1 - T_s$).

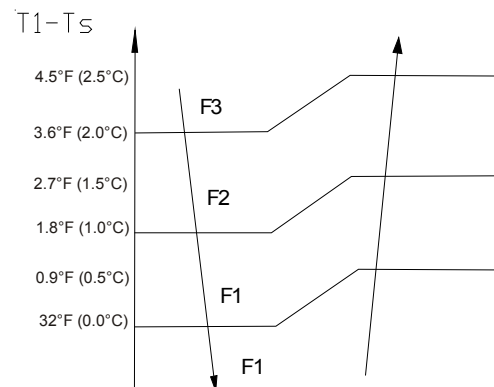
$\Delta T = T_1 - T_s$	Running Mode
$\Delta T > 1.8^\circ\text{F}$ (1°C)	Cooling
$-1 < \Delta T \leq 1.8^\circ\text{F}$ (1°C)	Fan-Only
$\Delta T \leq -1.8^\circ\text{F}$ (1°C)	Heating

The indoor fan will run at AUTO FAN at the relevant mode. The louver operates the same as in the relevant mode. If the unit

switches between heating and cooling modes, the compressor will continue stopping for 15 minutes, at which time, it will choose the mode according to $T_1 - T_s$ again.

DRYING MODE:

1. During this mode, the indoor fan speed is fixed at breeze and cannot be changed. The louver angle is the same as in cooling mode.
2. Compressor running rules:



SERVICE

19 SEER

3. Room overflow temperature protection: If the unit is in DRYING mode and the room temperature is lower than 50°F (10°C), the compressor will stop and will not resume until the room temperature exceeds 54°F (12°C).
4. Evaporator anti-freezing protection, condenser high temperature protection and outdoor unit frequency limit are valid, and they are the same as that in cooling mode.
5. The outdoor fan operates the same as in cooling mode.

FORCED OPERATION MODE:

1. Entering forced operation function: When in the OFF position, pressing the touch button will place the unit in forced AUTO MODE. Pressing the button again within 5 seconds, the unit will be placed in forced COOLING MODE. If the unit is in forced AUTO, COOLING or any other operational mode, pressing the touch button will turn off the unit.
2. In forced operation mode, all general protections and the remote control are available.
3. Operation:
Forced COOLING mode: The compressor runs at F2 frequency and the indoor fan runs as breeze. After running for 30 minutes, the unit will turn to AUTO mode as 24° setting temperature.
Force AUTO mode: The action for forced AUTO mode is the same a normal AUTO mode, with 75°F (24°C) setting temperature.

TIMER FUNCTION:

1. The timing range of the unit is 24 hours. The minimum resolution is 15 minutes, according to the remote control.
2. Timer ON: After turning OFF, the unit will turn on automatically after reaching the set time.
3. Timer OFF: After turning ON, the unit will turn off automatically after reaching the set time.
4. Timer ON/OFF: After turning OFF, the unit will turn on automatically after reaching the set ON time. It will turn OFF automatically after reaching the set OFF time.
5. Timer OFF/ON: After turning ON, the unit will turn off automatically after reaching the set OFF time. It will turn ON automatically after reaching the set ON time.

6. The set time is not the current time but the time you want to program the unit to automatically begin and end operation.
7. The tolerance range os the timer is 1 minute per hour.

SLEEP FUNCTION MODE:

1. The unit will operate for 7 hours in SLEEP mode. After 7 hours, the unit ends this mode and turns off.
2. SLEEP mode operation: After pressing ECONOMIC or SLEEP button on the remote control, the unit will begin SLEEP mode. When cooling, the setting temperature rises 1° (must be lower than 30°) every hour. 2 hours later, the setting temperature stops rising and the indoor fan is fixed at low speed. (Anti-cold wind function is the priority function.)
3. Timer setting is available.
4. If the time set is less than 7 hours when the TIMER OFF function is used in SLEEP mode (or SLEEP function in TIMER OFF mode), sleep functions will be cancelled when the set time is reached. If the time set is more than 7 hours, the unit will not stop until the set time is reached in SLEEP mode.

AUTORE-START FUNCTION:

The indoor unit is equipped with an AUTO-RESTART function, which is carried out through an AUTO-RESTART module. In case of sudden power failure, the module memorizes the set conditions before the power failure. The unit will resume the previous operation setting automatically when the power returns after the power returns (SWING function does not support the AUTO RE-START function.)

If the pre-set condition is forced COOLING mode, the unit will operate in COOLING mode for 30 minutes and turn to AUTO mode as 75°F (24°C) setting temperature.

If the unit is off before the loss of power and the unit is required to resume power, the compressor will have a 1 minute delay when the power is restored. (For all other conditions, the compressor have a 3 minute delay upon restart.)

TROUBLESHOOTING

15 SEER & 19 SEER

TROUBLESHOOTING:

15 SEER Indoor Unit Error Display

# of Flashes	Timer Lamp	LED STATUS
1	X	EEPROM parameter error
2	X	Indoor/outdoor units communication protection
3	X	Zero-crossing detection error
4	X	Indoor fan speed out of control
5	X	Indoor room temperature sensor T1 open circuit or short circuit
6	X	Evaporator coil temperature sensor T2 open circuit or short circuit
7	X	Refrigerant leak detection error
2	O	Outdoor room temperature sensor T4 open circuit or short circuit
3	O	Condenser coil temperature sensor T3 open circuit or short circuit
4	O	Compressor discharge temperature sensor T5 open circuit or short circuit
5	O	Outdoor EEPROM parameter error
1	+	IPM malfunction or IGBT over-strong current
2	+	Over voltage or too low voltage protection
3	+	Temperature protection of compressor top (only for 24k models)
5	+	Inverter compressor drive error

X (off) O (Light) + (Flash)

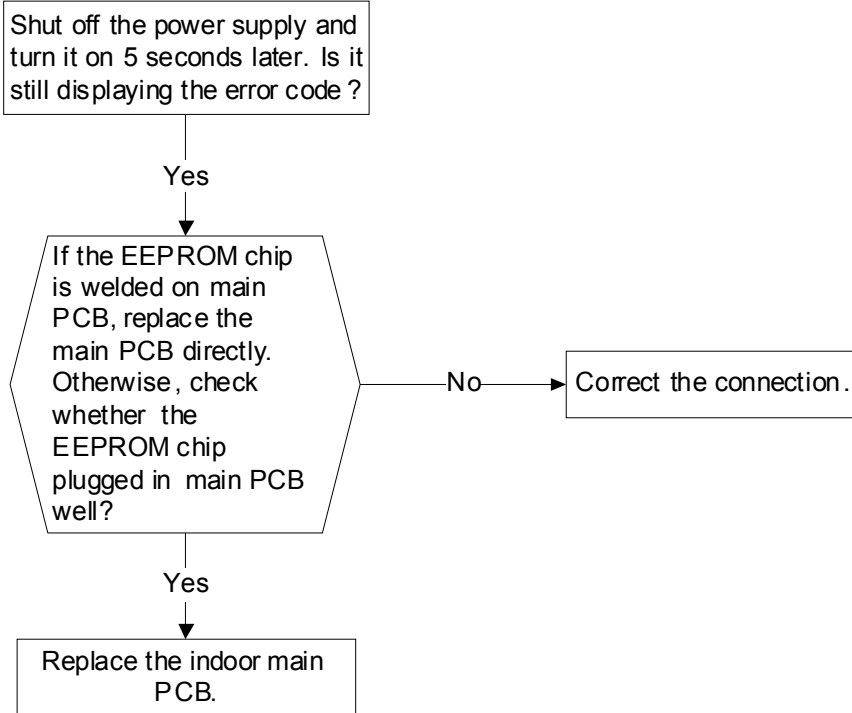
19 SEER Indoor Unit Error Display

Display	LED STATUS
E0	EEPROM parameter error
E1	Indoor/outdoor units communication protection
E2	Zero-crossing detection error
E3	Indoor fan speed out of control
E5	Open or short circuit of outdoor temperature sensor or outdoor EEPROM error
E6	Open or short circuit of room or evaporator temperature sensor
E7	Outdoor fan speed out of control
P0	IPM malfunction
P1	Over voltage or too low voltage protection
P2	Temperature protection of compressor top
P4	Inverter compressor drive error

NOTE: E4: Reserved Function

Diagnosis and Solution

.1 EEPROM parameter error diagnosis and solution(E0)

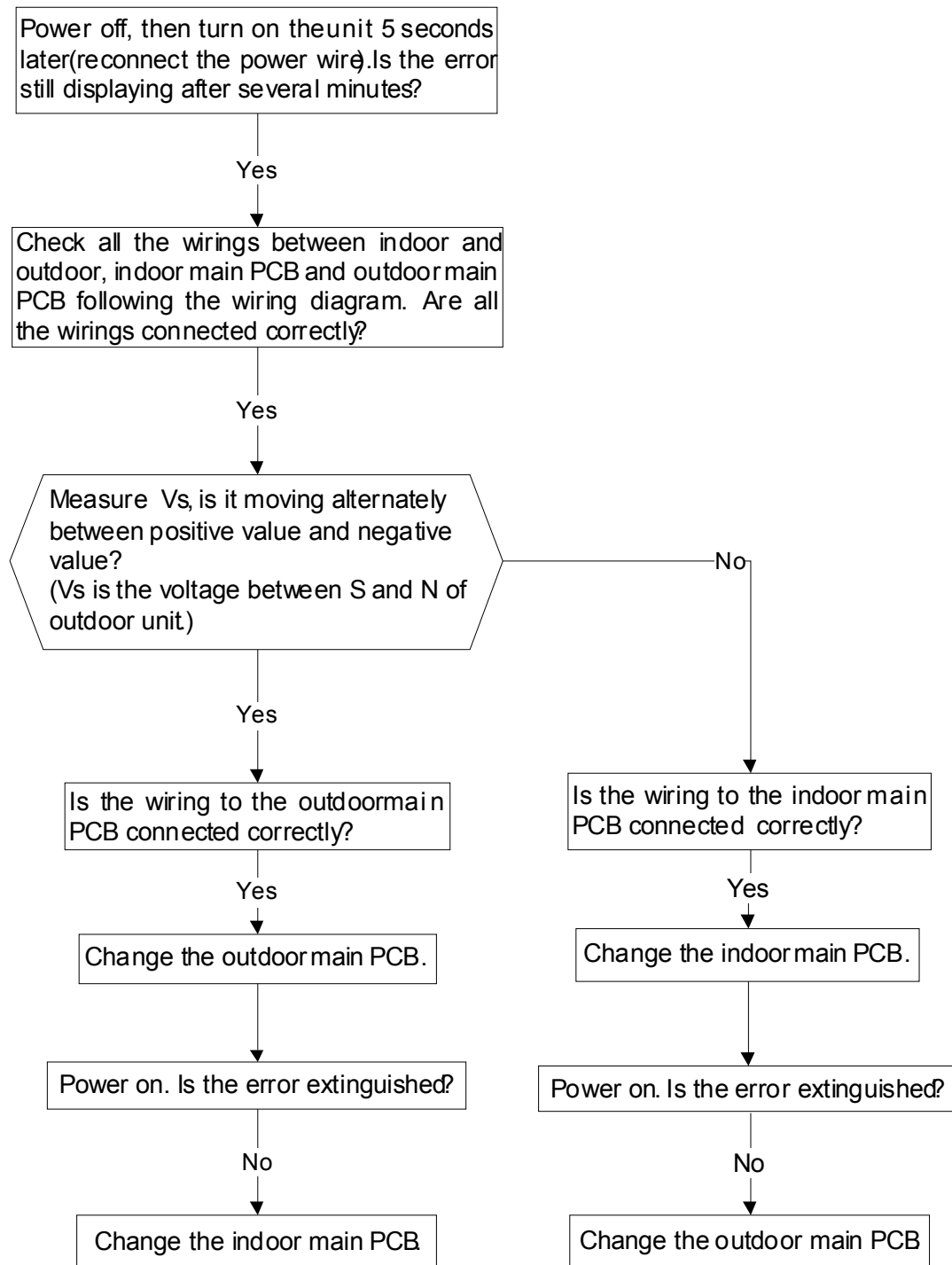


EEPROM: a read-only memory whose contents can be erased and reprogrammed using a pulsed voltage.

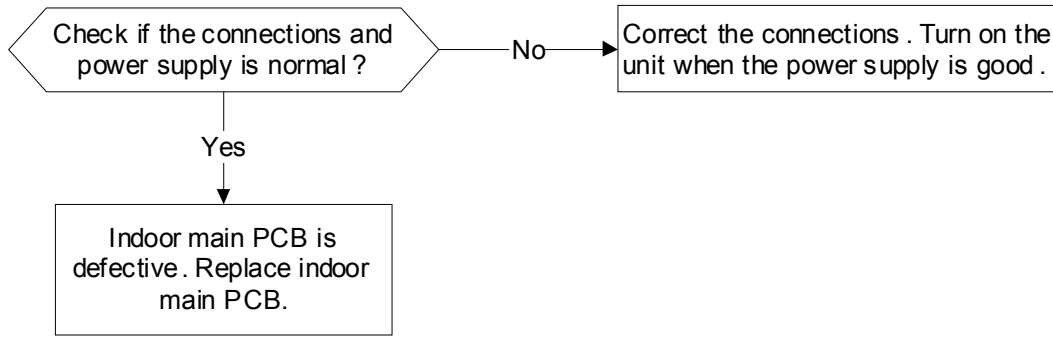
TROUBLESHOOTING

15 SEER & 19 SEER

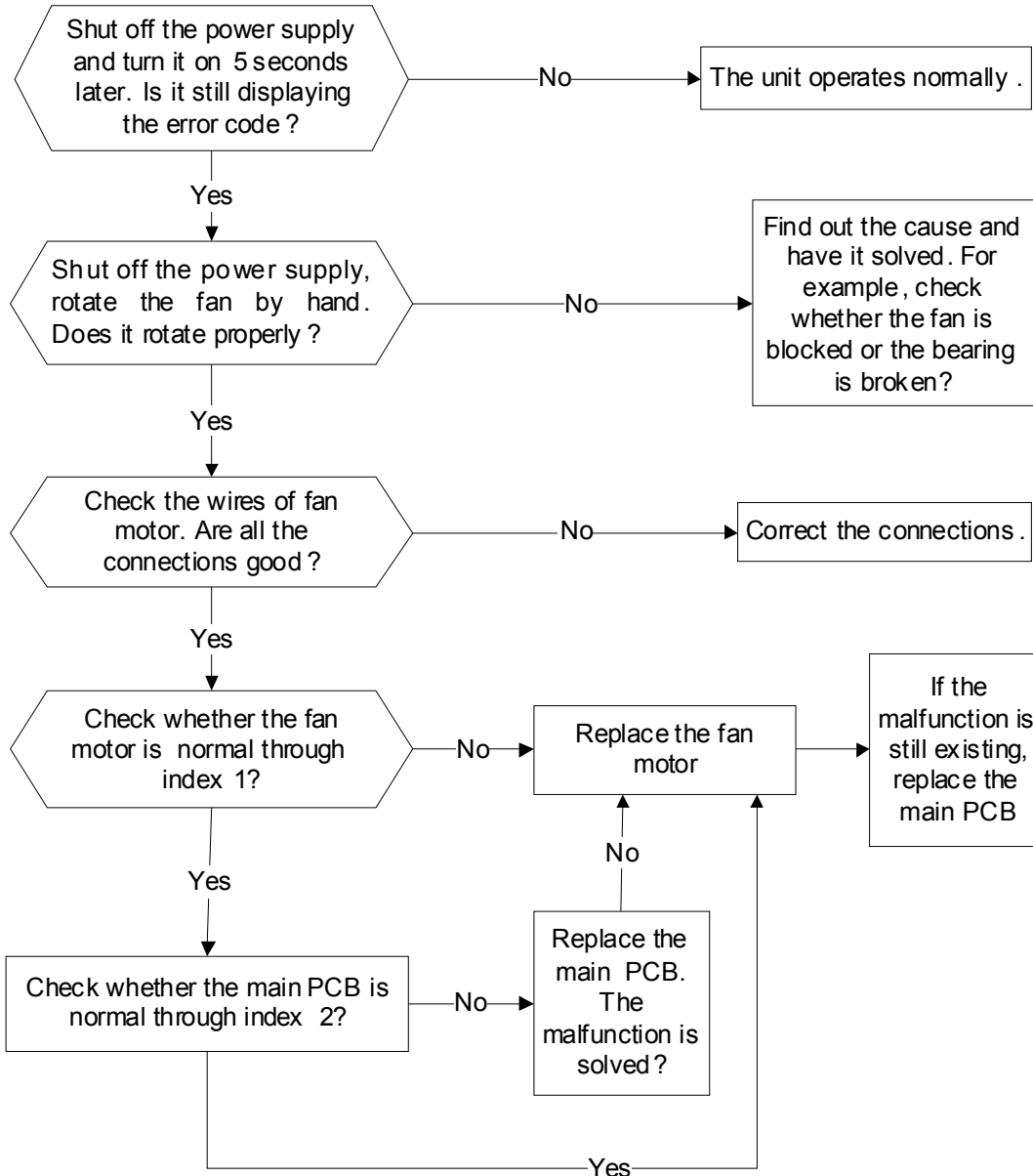
2 Indoor / outdoor units communication diagnosis and solution(E1)



3 Zero crossing detection error diagnosis and solution(E2)



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



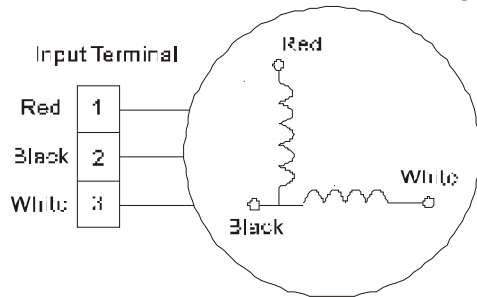
TROUBLESHOOTING

15 SEER & 19 SEER

Index 1:

1. Indoor AC Fan Motor

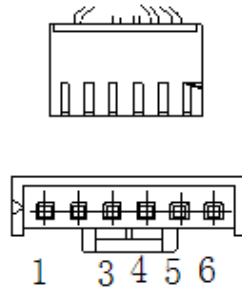
Measure the resistance value of each winding by using the tester.



For the definite value of the resistance, contact the technical engineer.

2. Outdoor DC Fan Motor (control chip is in fan motor)

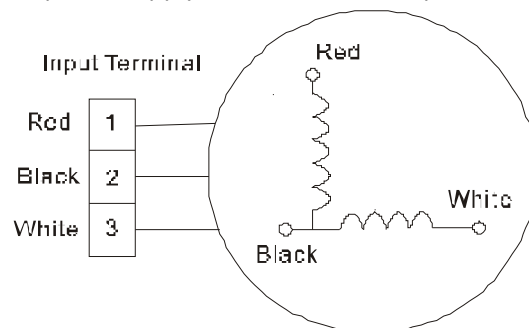
Measure the resistance value of each winding by using the tester. If any resistance value is zero, the fan motor must have problems and need to be replaced.



Index2:

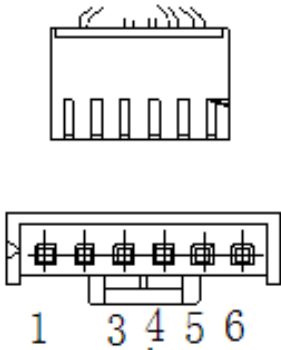
1: Indoor AC Fan Motor

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. Outdoor DC Fan Motor (control chip is in fan motor)

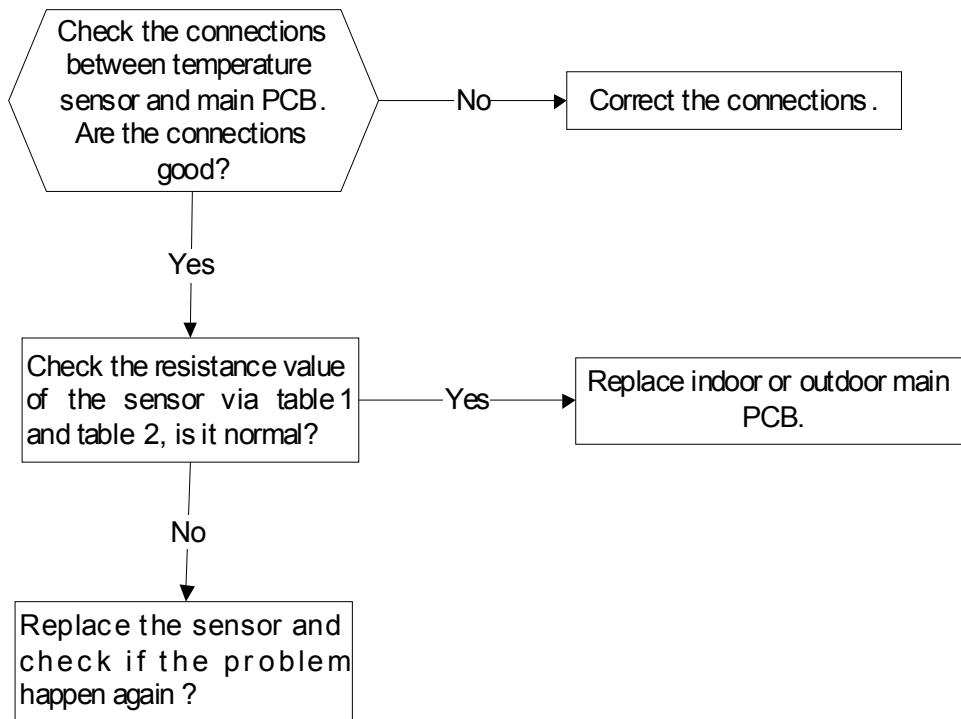
Power on and when the unit is in standby, measure the voltage of pin1-pin3, pin4-pin3 in fan motor connector. If the value of the voltage is not in the range showing in below table, the PCB must have problems and need to be replaced.



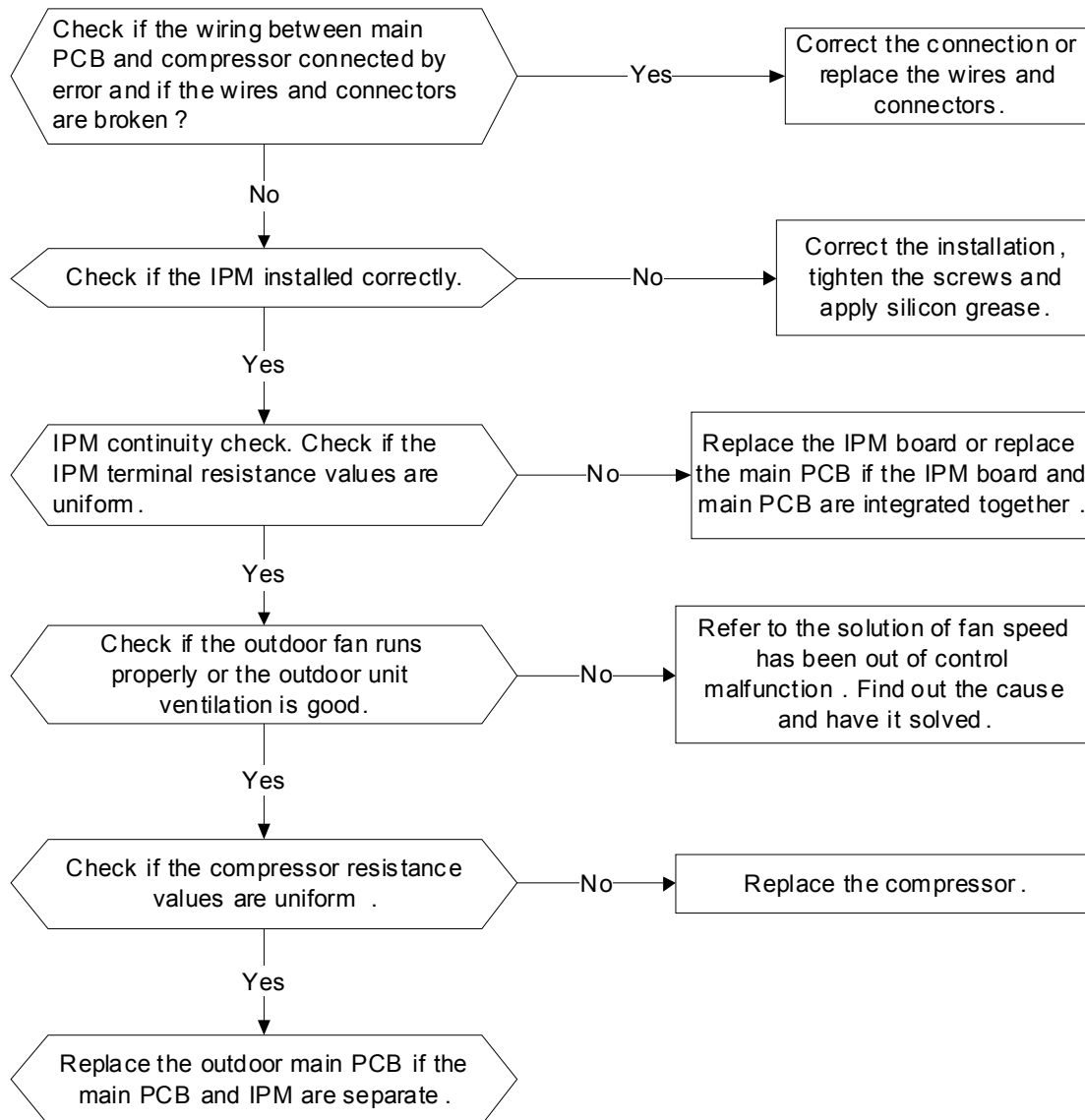
DC motor voltage input and output

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	14-17.5V

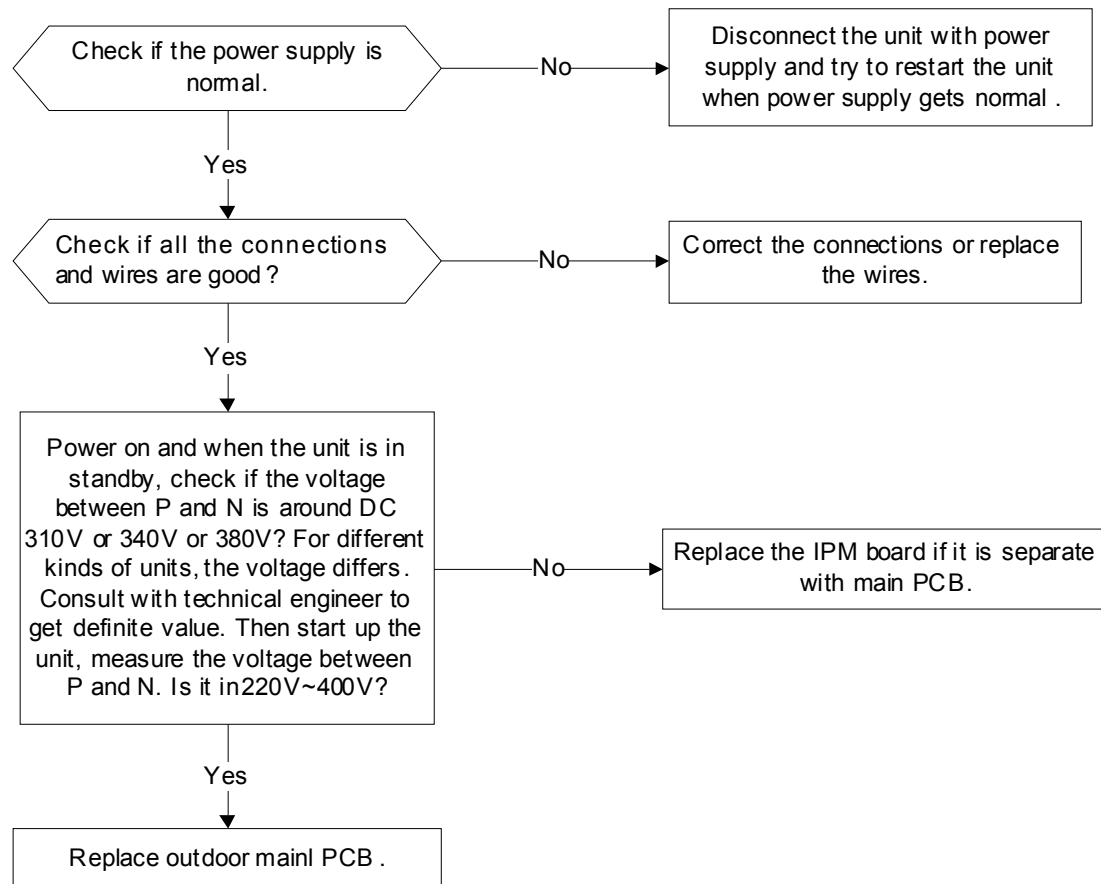
.5 Open circuit or short circuit of temperature sensor diagnosis and solution(E5/E6)



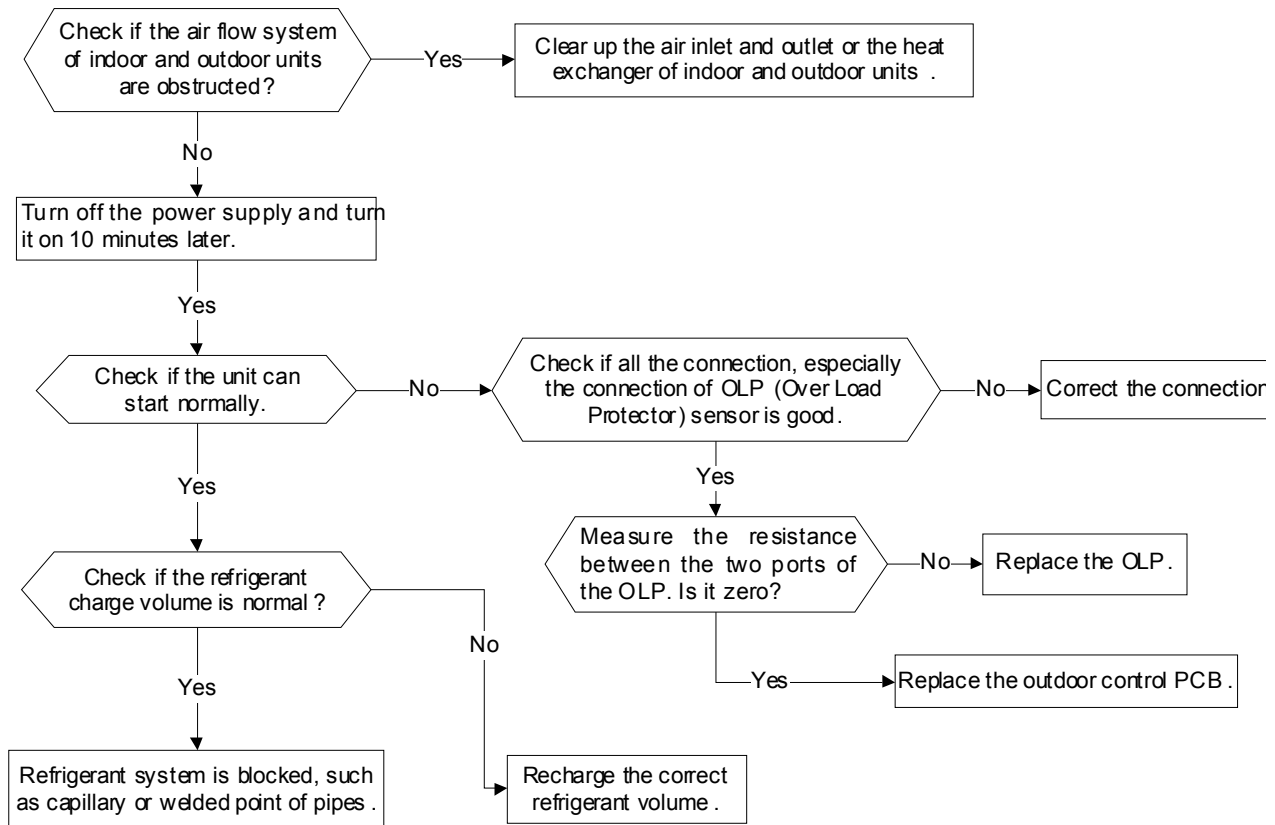
.6 IPM malfunction or IGBT over-strong current protection diagnosis and solution(P0)



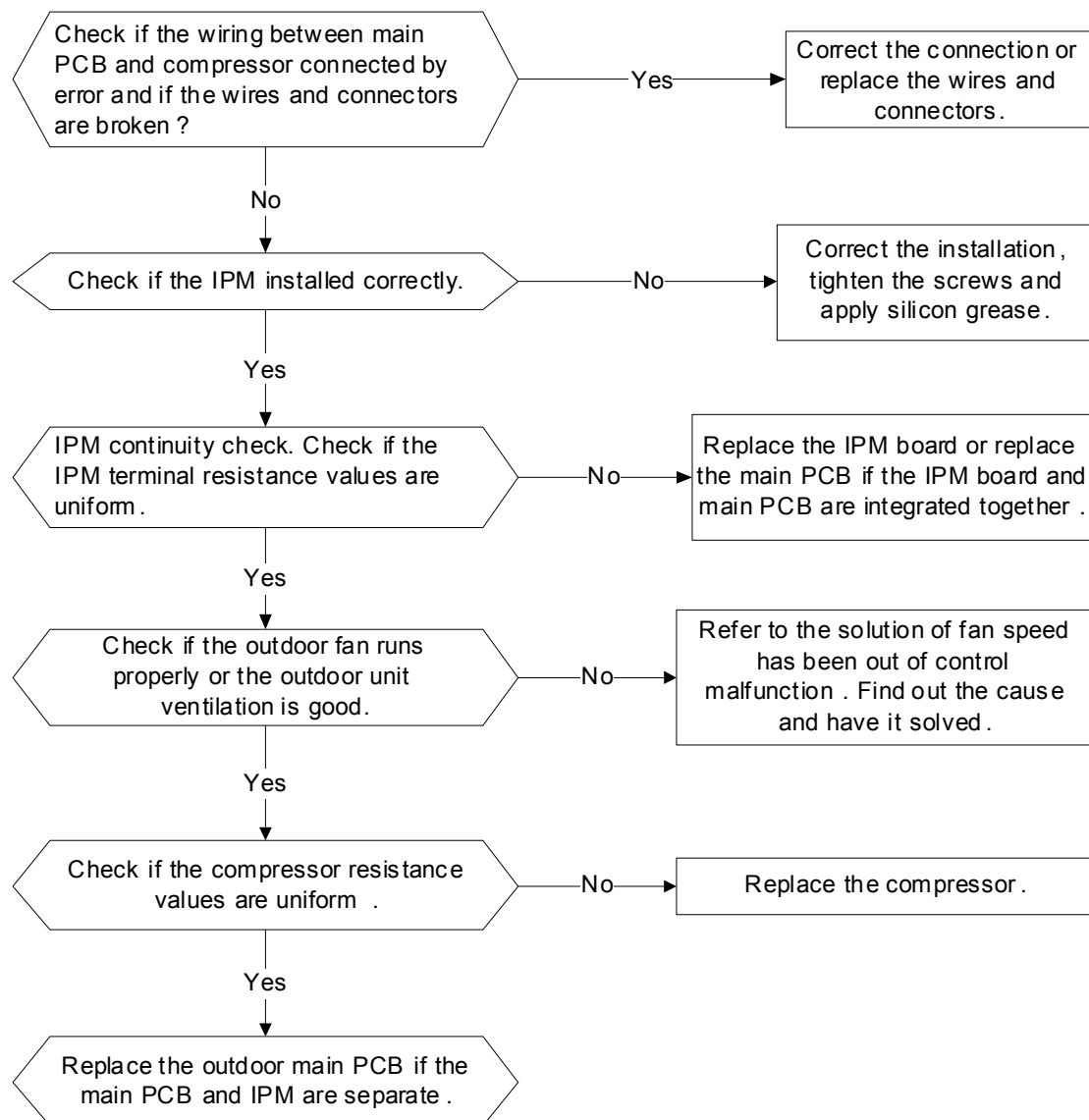
.7 Over voltage or too low voltage protection diagnosis and solution (P1)



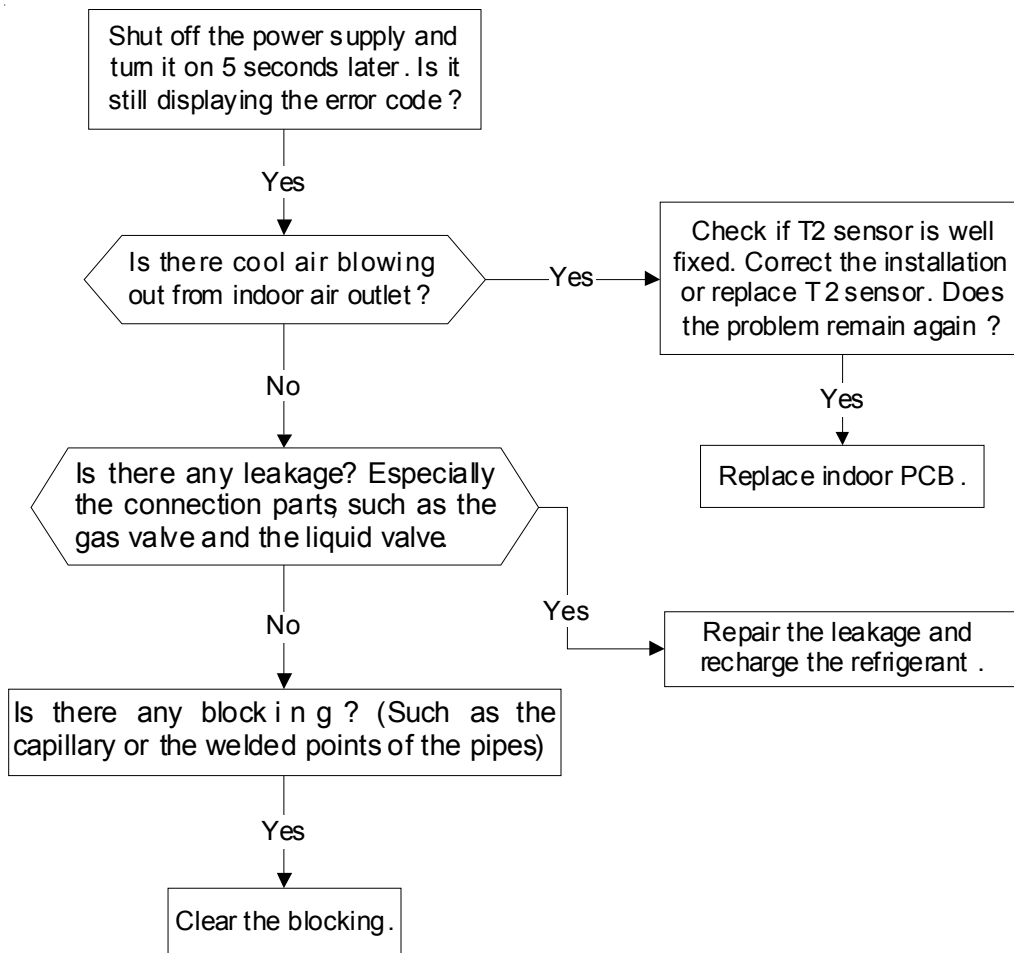
.8 High temperature protection of compressor top diagnosis and solution (P2)



.9 Inverter compressor drive error diagnosis and solution (P4).



.10 Refrigerant Leakage Detection diagnosis and solutions (EC) *ONLY FOR 15 SEER MODELS*



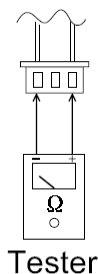
TROUBLESHOOTING

15 SEER & 19 SEER

Main parts check

➤ Temperature sensor checking

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



Tester

Temperature Sensors.

Room temp.(T1) sensor,

Indoor coil temp.(T2) sensor,

Outdoor coil temp.(T3) sensor,

Outdoor ambient temp.(T4) sensor,

Compressor discharge temp.(T5) sensor.

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

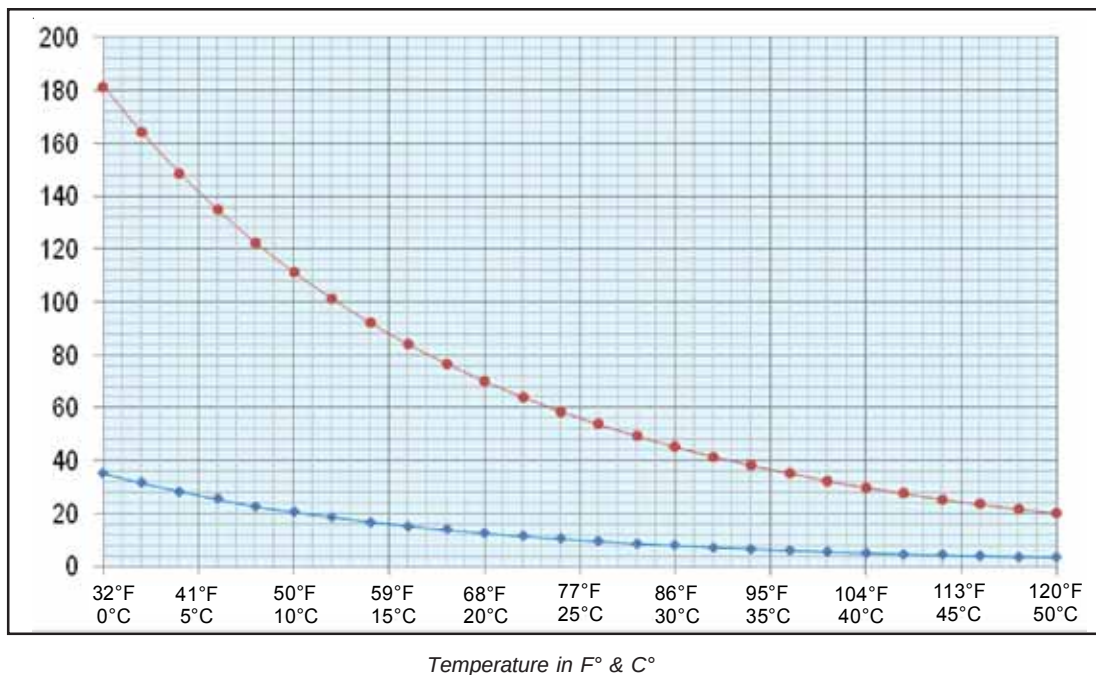
Table 1: Some frequently-used R-T data for T1,T2,T3 and T4 sensor:

Temperature F° (C°)	41°F (5°C)	50°F (10°C)	59°F (15°C)	68°F (20°C)	77°F (25°C)	86°F (30°C)	104°F (40°C)	120°F (50°C)	140°F (60°C)
Resistance Value KΩ	26.9	20.7	16.1	12.6	10	8	5.2	3.5	2.4

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

Temperature F° (C°)	41°F (5°C)	59°F (15°C)	77°F (25°C)	95°F (35°C)	140°F (60°C)	158°F (70°C)	176°F (80°C)	194°F (90°C)	212°F (100°C)
Resistance Value KΩ	141.6	88	56.1	36.6	13.8	9.7	6.9	5	3.7

Resistance value (KΩ)



TROUBLESHOOTING

15 SEER & 19 SEER

Appendix1 Celsius to Fahrenheit degree:

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

Appendix2: Motor specification:

IDU motor				
Model	Brand	Input	LRA	Winding Resistance
RPG13B	Welling	32.5	0.182	530/315
RPG15A	Welling	46	0.54	75/150
RPG20B	Welling	43	0.23	381/267
RPG28A	Broad Ocean	57.4	0.57	70.3/66.8
RPG28H	Welling	58.5	0.356	183.6/206
RPG45B	Broad-ocean	80.5	0.56	118.5/78.5
RPG50B	Welling	102	0.66	100.5/64.5
WZDK20-38G	Shibaura	20(Output)	/	/
WZDK58-38G	Shibaura	58(Output)	/	/
YDK36-4CB(A)	Welling	82/79/58	0.48	242/79
YDK65-4B	Welling	113/87/68	0.8	81/75.5

TROUBLESHOOTING

15 SEER & 19 SEER

ODU motor				
Model	Brand	Input	LRA	Winding Resistance
WZDK180-38G	Shibaura	180(Output)	/	/
WZDK35-38G	Panasonic	35(Output)	/	/
WZDK35-38G(H)	Shibaura	35(Output)	/	/
WZDK50-38G	PANASONIC	50(Output)	/	/
WZDK72-38G	Panasonic	72(Output)	/	/
YDK100-6EB	Welling	140	0.72	65/50
YDK180-8GB	Welling	299/223	2	24.5/19
YDK190-8B	Welling	258	2.41	28.2/21.3
YDK23-6A	Welling	69	0.81	67.8/71.8
YDK24-6AS	Welling	64/47	0.81	50/177
YDK24-6GB	Welling	75/66	0.41	293/169
YDK24-6KB	Welling	70/60	0.37	385/208
YDK49-6B	Welling	119/96	0.80	84.5/137
YDK53-6B	Welling	154	1.09	66.4/75.6
YDK53-6FB	Welling	166/105	0.95	56/76
YDK53-6FB(B)	Welling	136/130	0.9	88.5/138
YDK53-6KB	Welling	182	1.18 (1.1)	51(42.5)/88(82.5)
YDK53-6KB(B)	Welling	148	0.92	86.5/105.8
YDK53-6NB	Welling	157.3/93.8	0.989	56.5/117.5
YDK65-6FB-1 / YDK65-6FB	Welling	164 / 164	0.945	56.2/86.5
YDK70-6FB	Welling	166/105	0.95	56/76

Appendix2: Compressor specification:

Model	Resistance (20°C)/Phase
DA108X1C-23EZ	1.1
DA108X1C-20FZ3	0.71 Ω
DA130M1C-31FZ	1.77
DA150S1C-20FZ	0.95 Ω
DA110S1C-30FZ	0.8
DA250S2C-30MT	0.55
TNB306 FPGMC-L	0.53 Ω
DA130S1C-20FZ	0.95 Ω

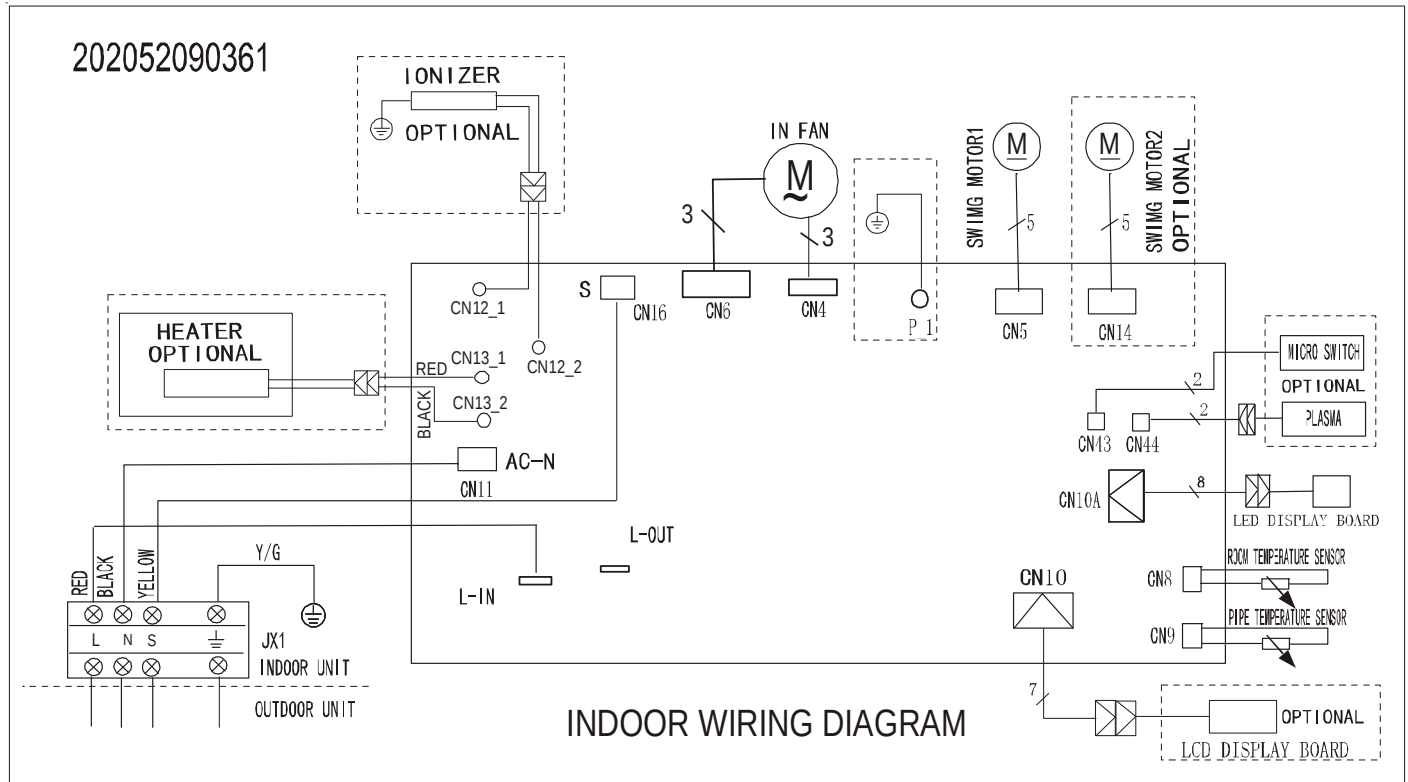
WIRING DIAGRAMS

15 SEER

WARNING

HIGH VOLTAGE!
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

MSC/MSH- 9,000 (115V) Cooling & Heating



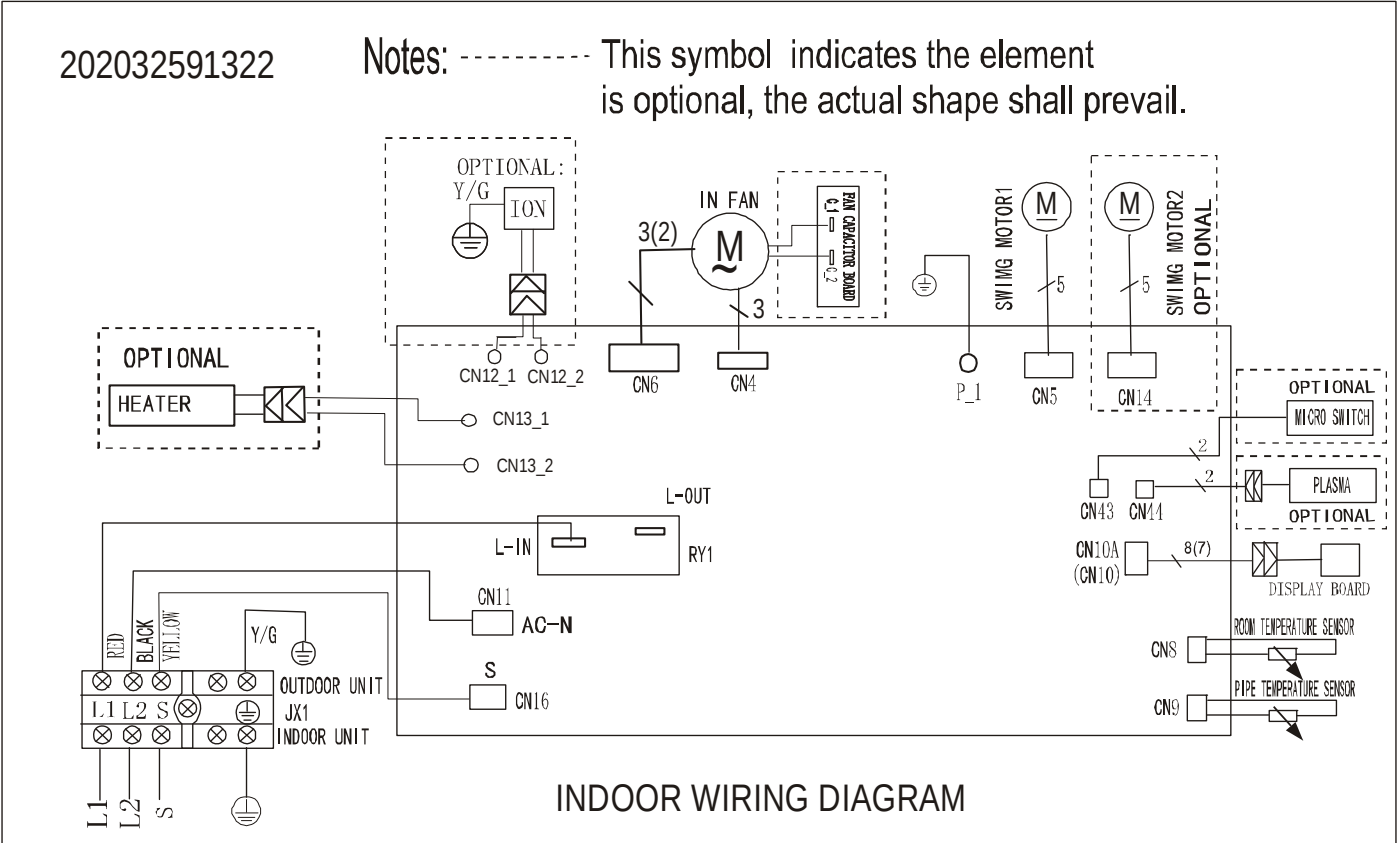
Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

**WARNING**

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSC/MSH- 12,000 (230V) Cooling & Heating



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

WIRING DIAGRAMS

15 SEER

WARNING

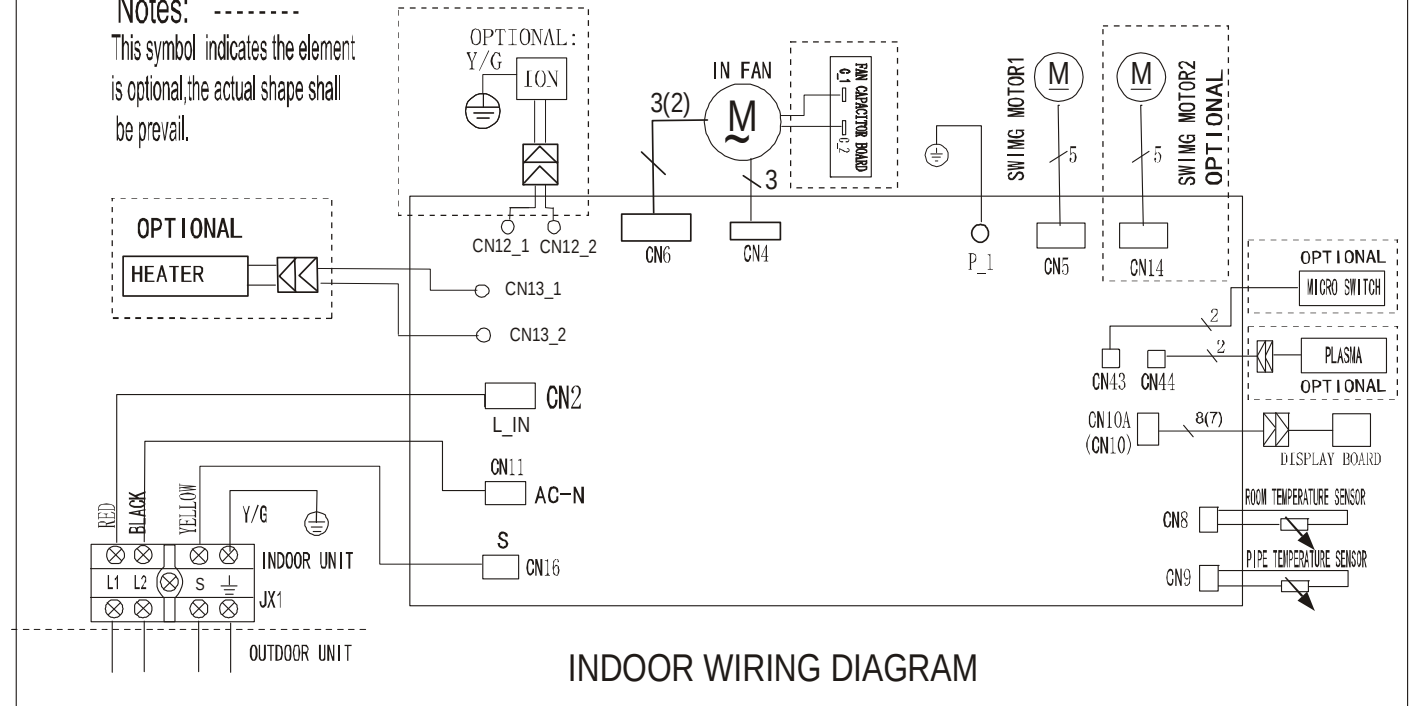
HIGH VOLTAGE!
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

MSC/MSH- 18,000 (230V) Cooling & Heating

202032891196

Notes:

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



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

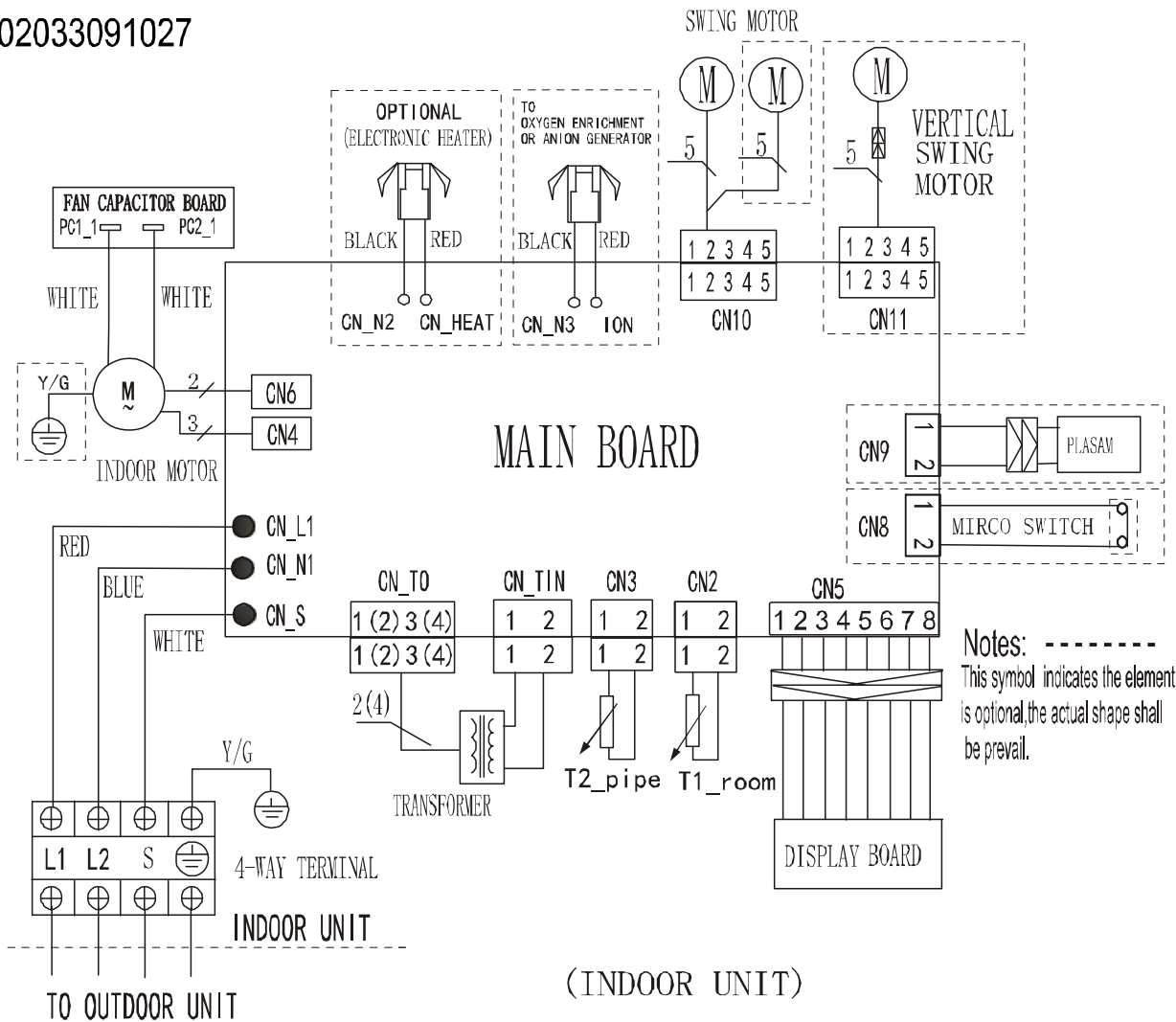
**WARNING**

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSC/MSH- 22,000 (230V) Cooling & Heating

WIRING DIAGRAM
202033091027



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

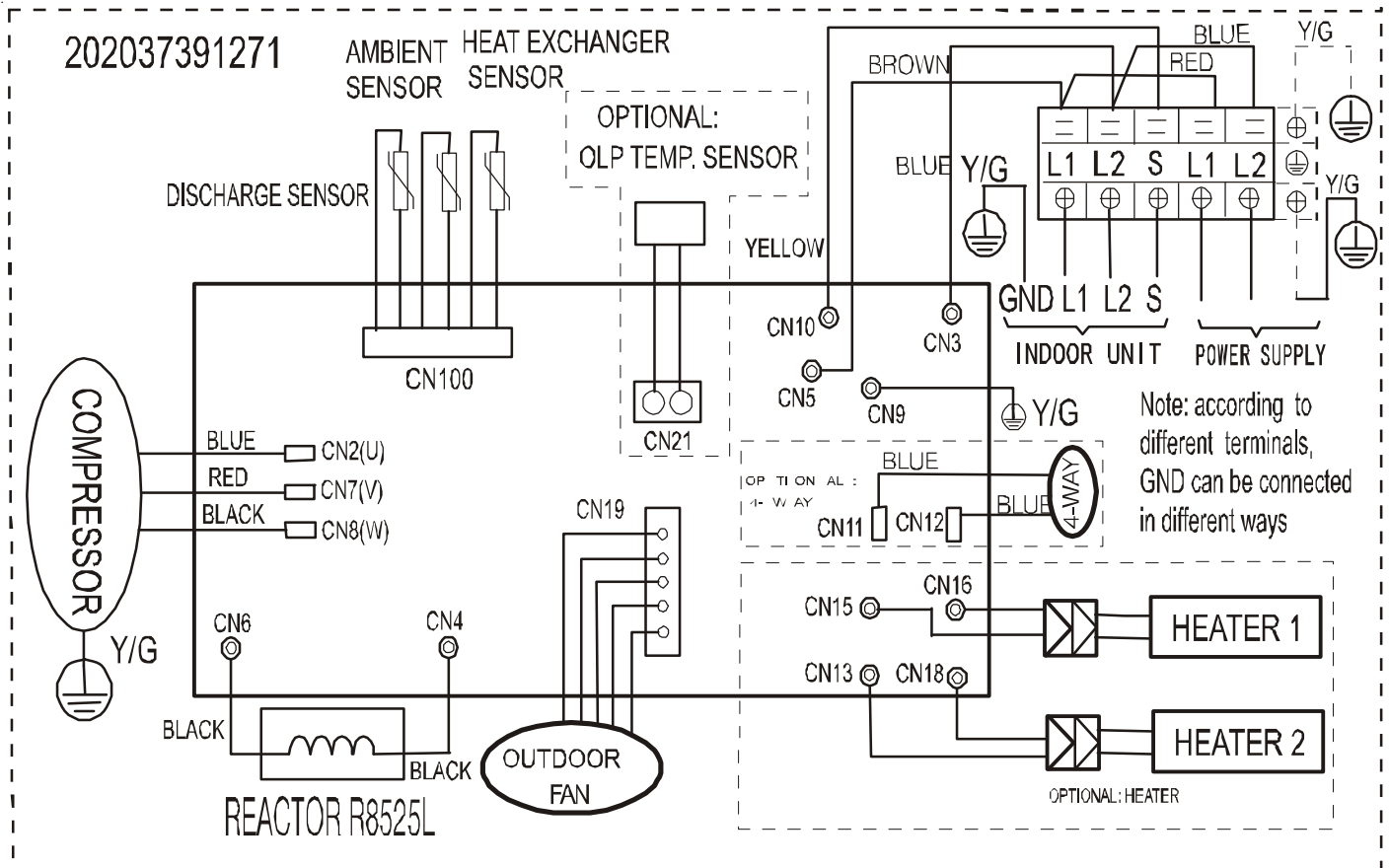
WIRING DIAGRAMS

15 SEER

WARNING

HIGH VOLTAGE!
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

MSC/MSH- 9,000 (115V) Cooling & Heating



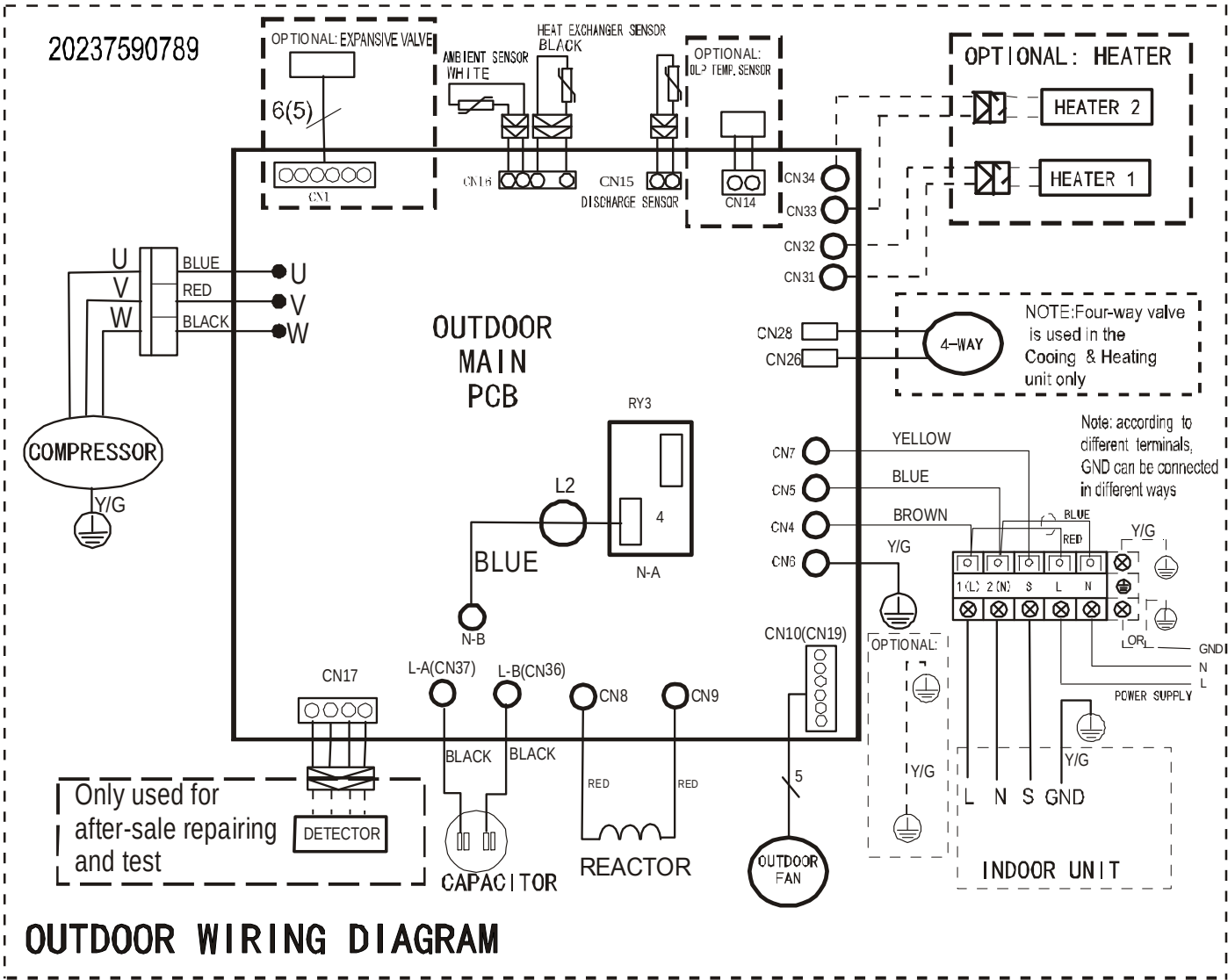
Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

**WARNING**

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSC/MSH- 12,000 Cooling & Heating



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

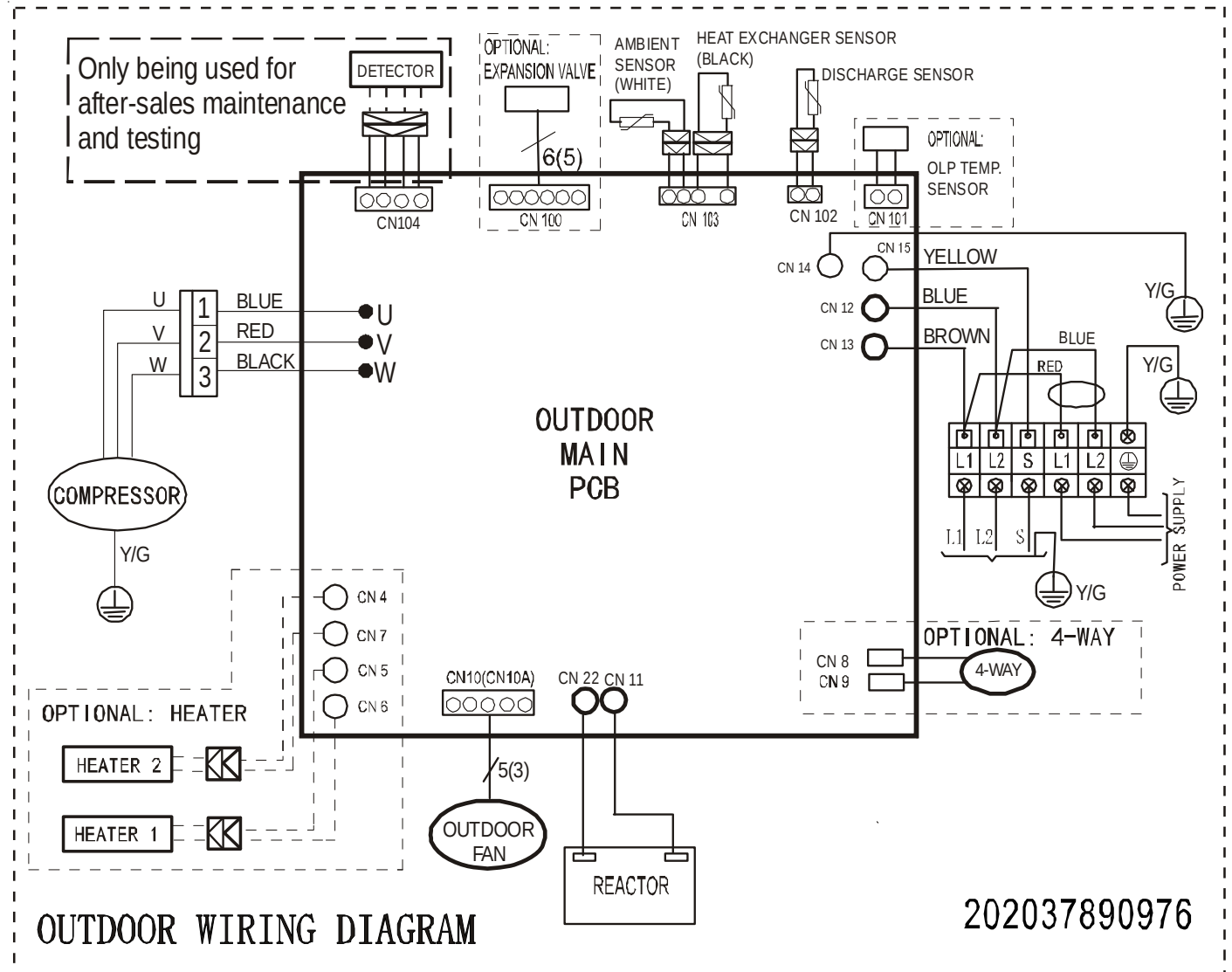
WIRING DIAGRAMS

15 SEER

WARNING

HIGH VOLTAGE!
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

MSC/MSH- 18,000 Cooling & Heating



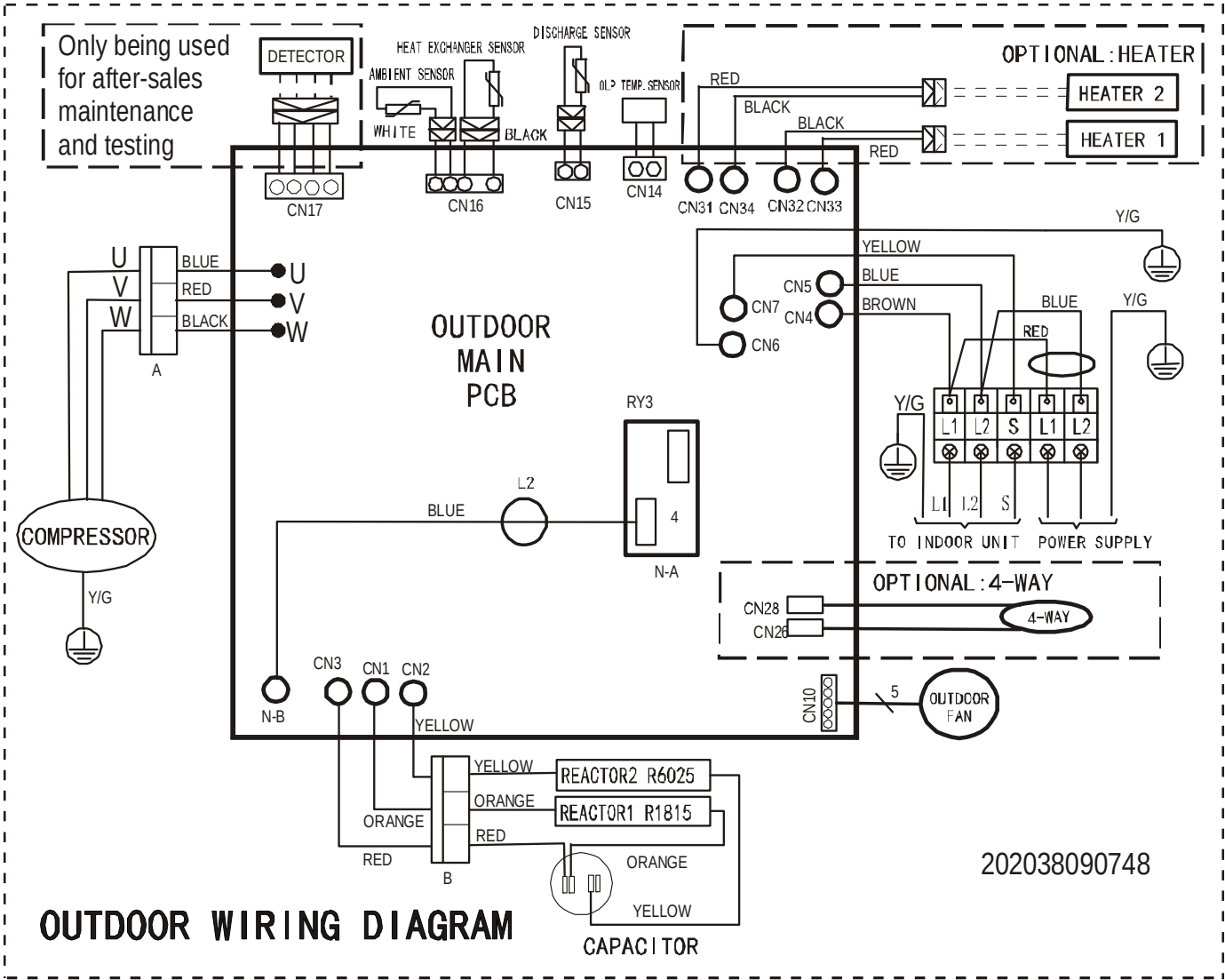
Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

**WARNING**

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSC/MSH- 22,000 Cooling & Heating



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

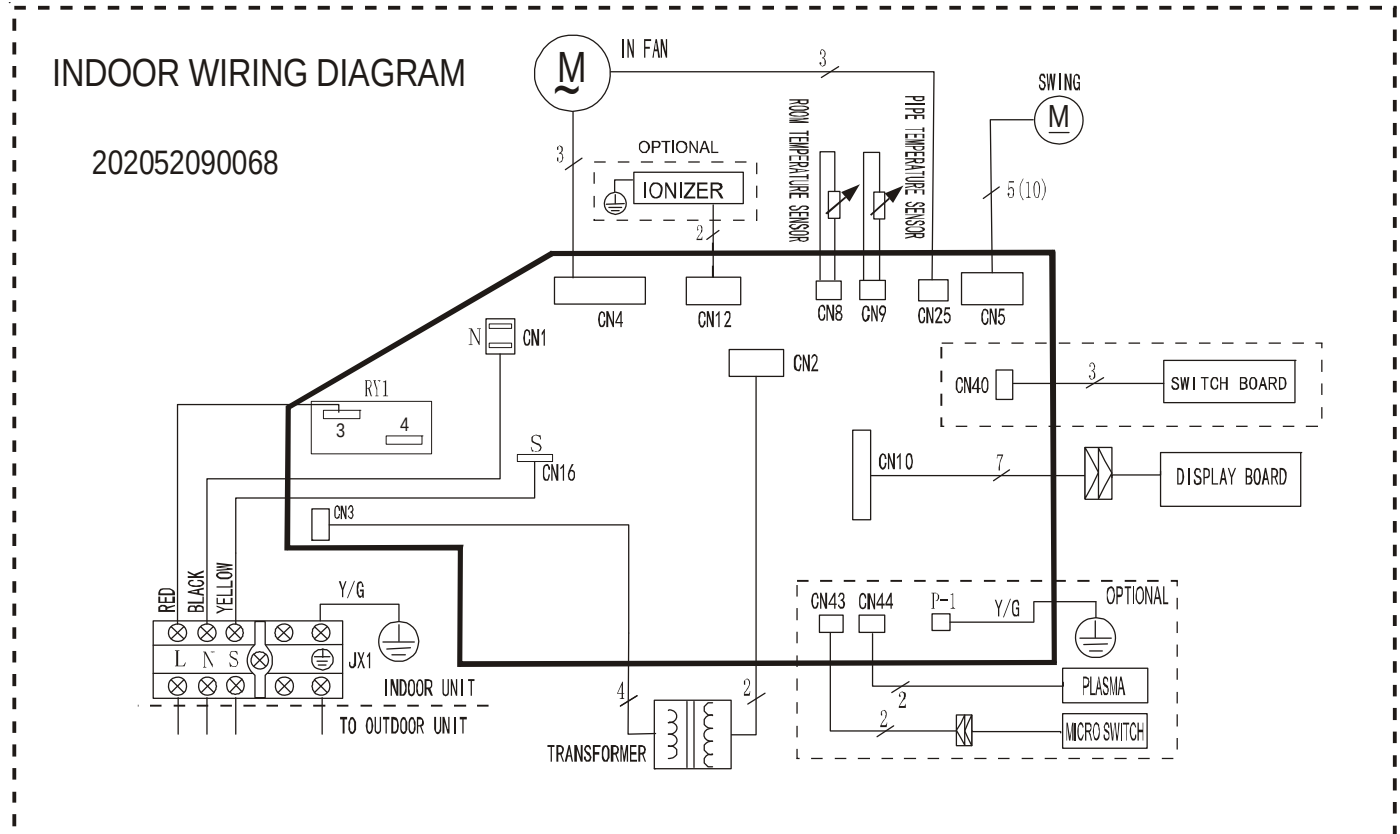
WIRING DIAGRAMS

19 SEER

WARNING

HIGH VOLTAGE!
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

MSC/MSH- 9,000 - 12,000 (115V) - Cooling & Heating



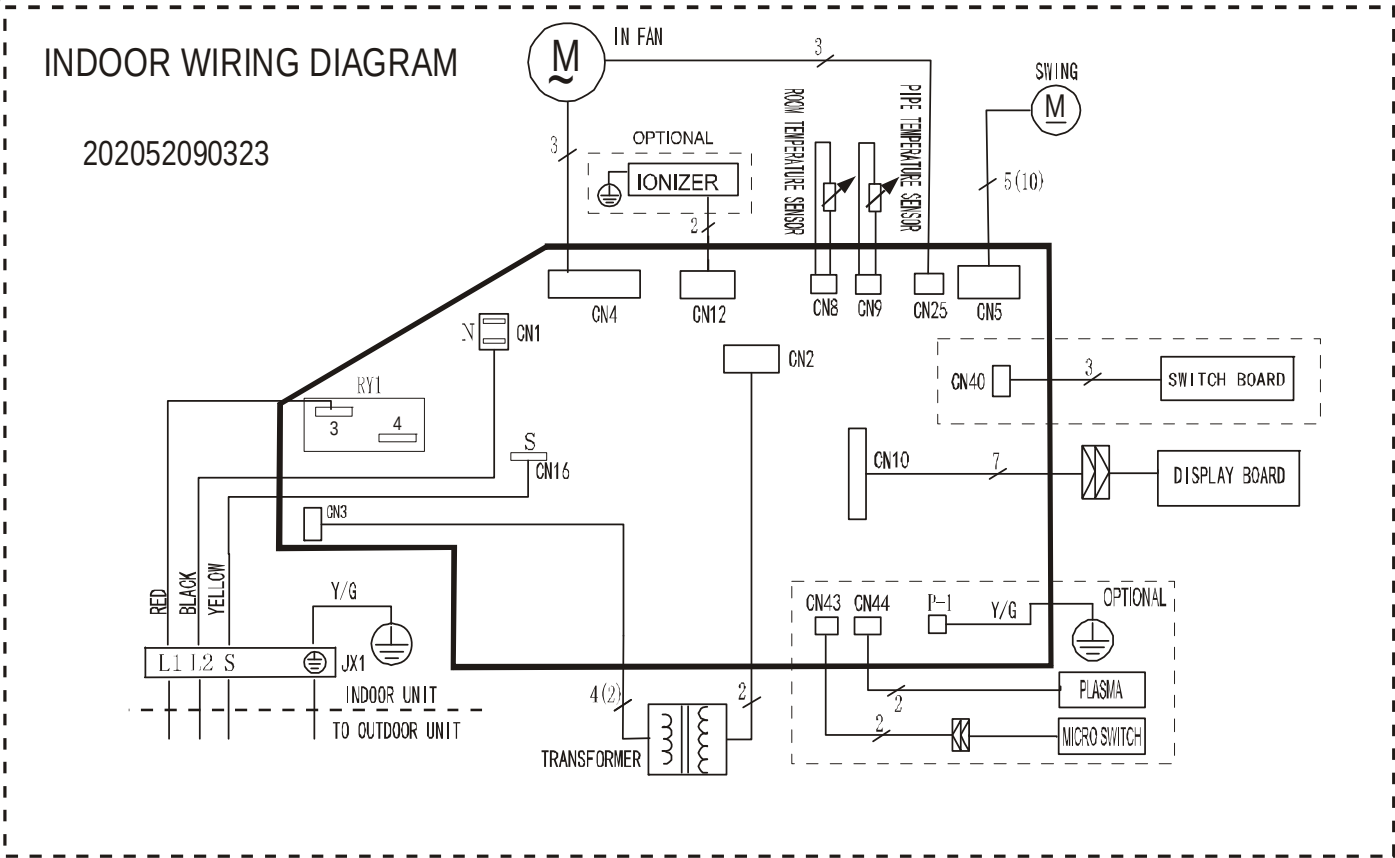
Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

**WARNING**

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSH/MSH 12,000 (230V) - Cooling & Heating



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

WIRING DIAGRAMS

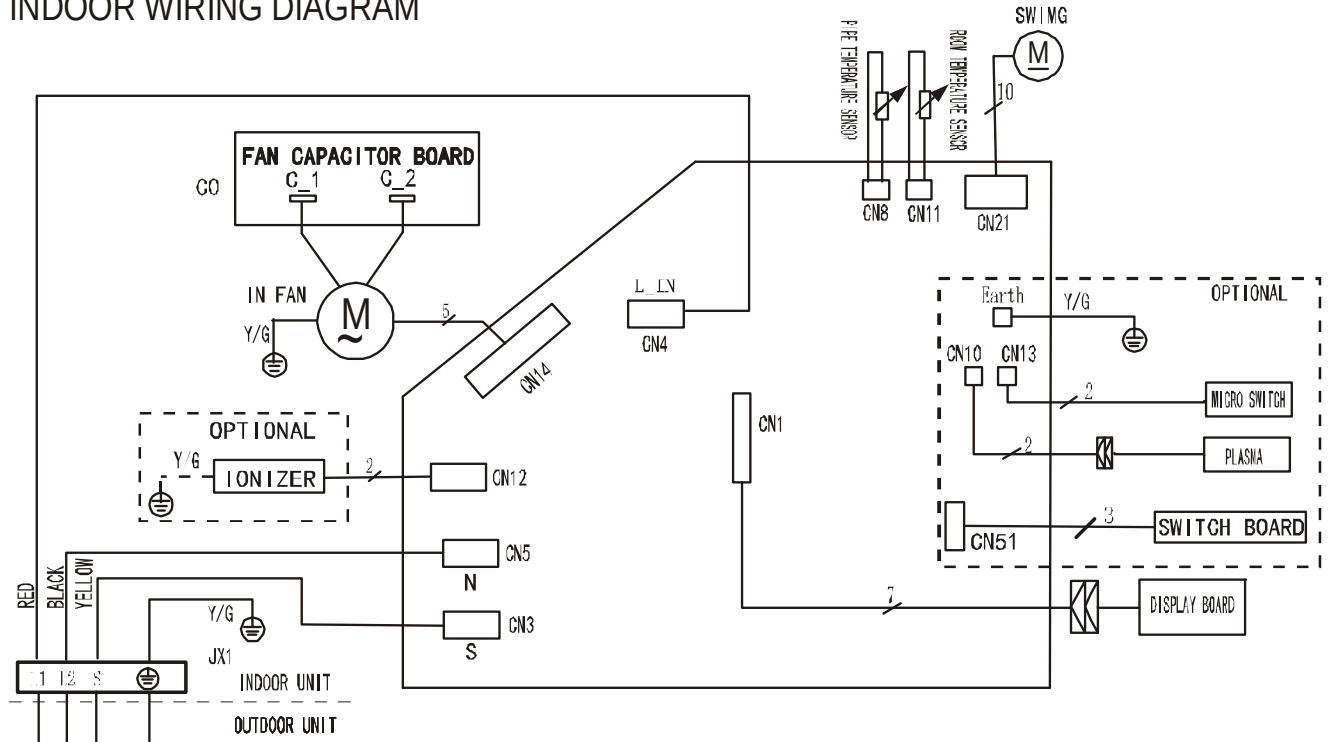
19 SEER

WARNING

HIGH VOLTAGE!
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

MSC/MSH- 18,000 (230V) - Cooling & Heating

INDOOR WIRING DIAGRAM



202033090774

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

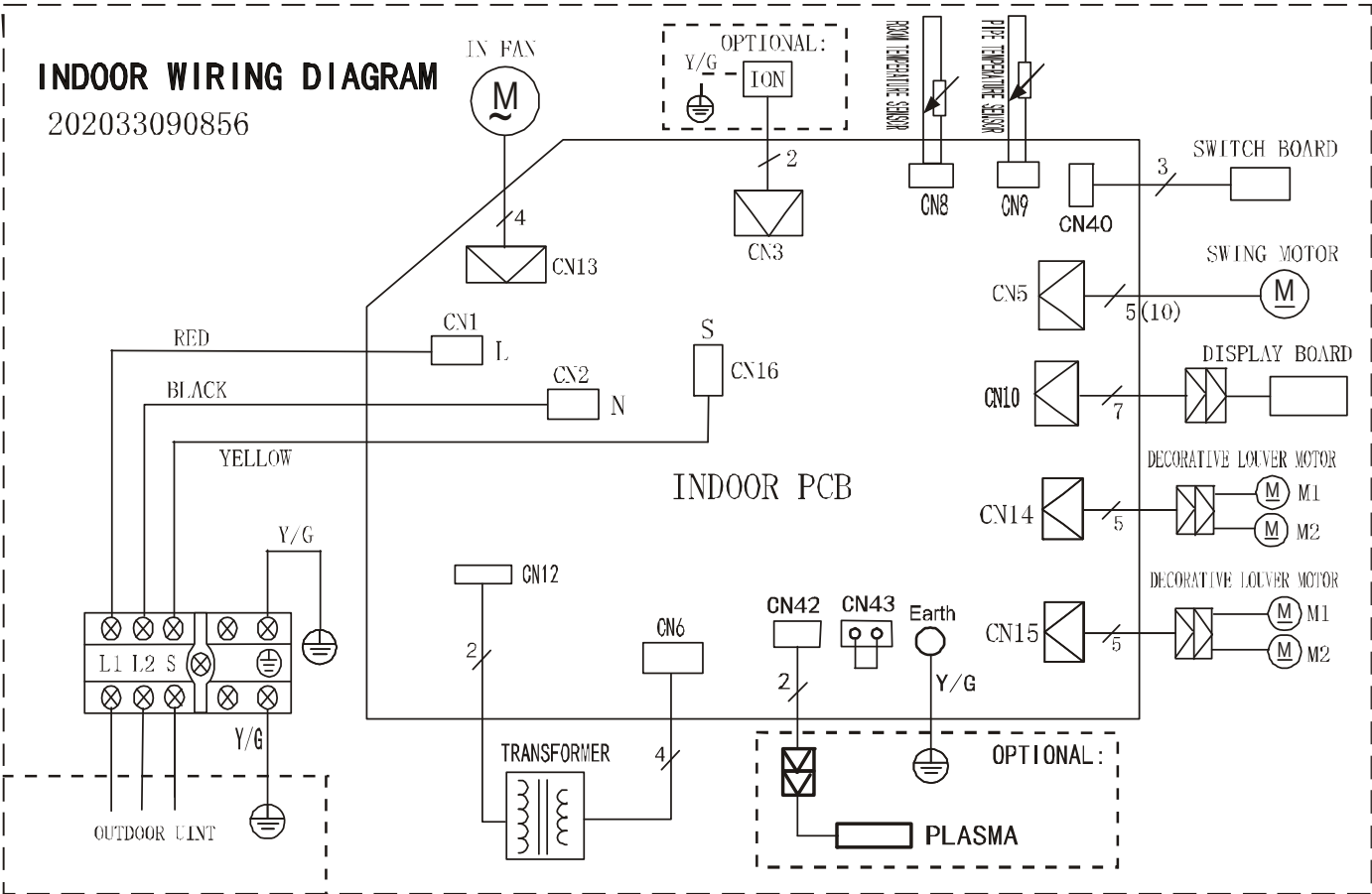
----- Indicates optional accessory.

**WARNING**

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSH/MSH - 24,000 (230V) - Cooling & Heating



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

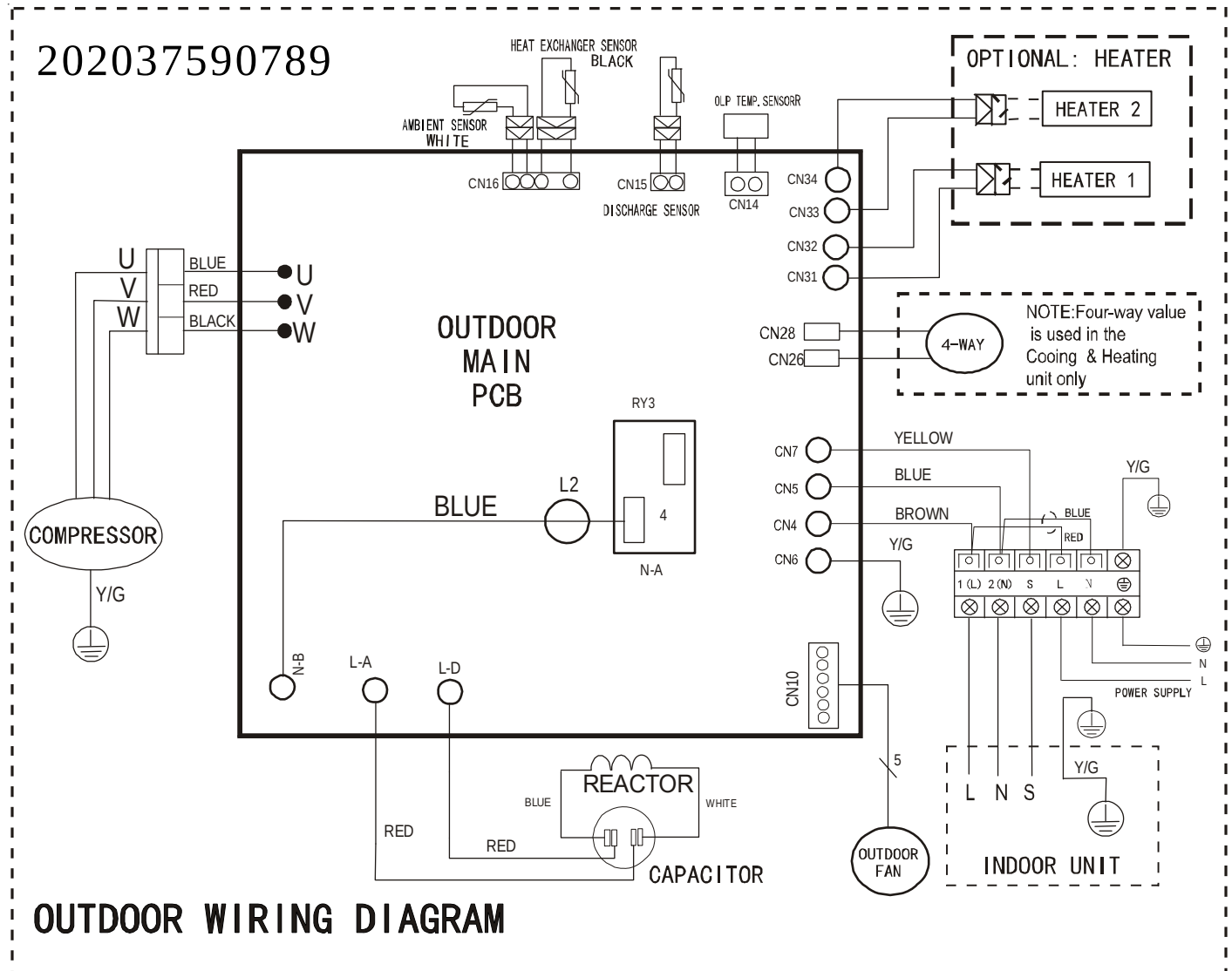
WIRING DIAGRAMS

19 SEER

WARNING

HIGH VOLTAGE!
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

MSC/MSH - 9,000 - 12,000 (115V) - Cooling and Heating



OUTDOOR WIRING DIAGRAM

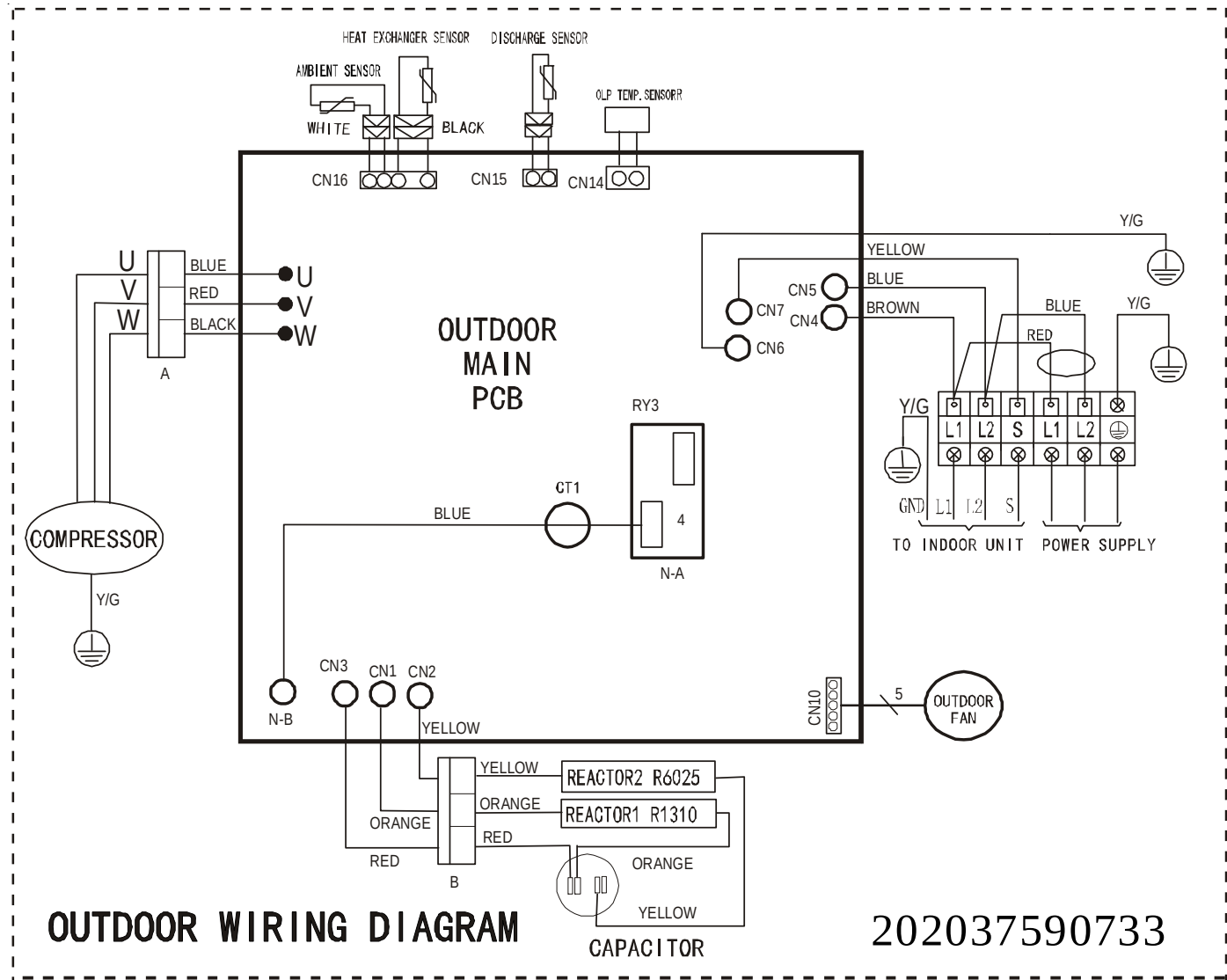
Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

**WARNING**

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSC - 12,000 (230V) - Cooling Only



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

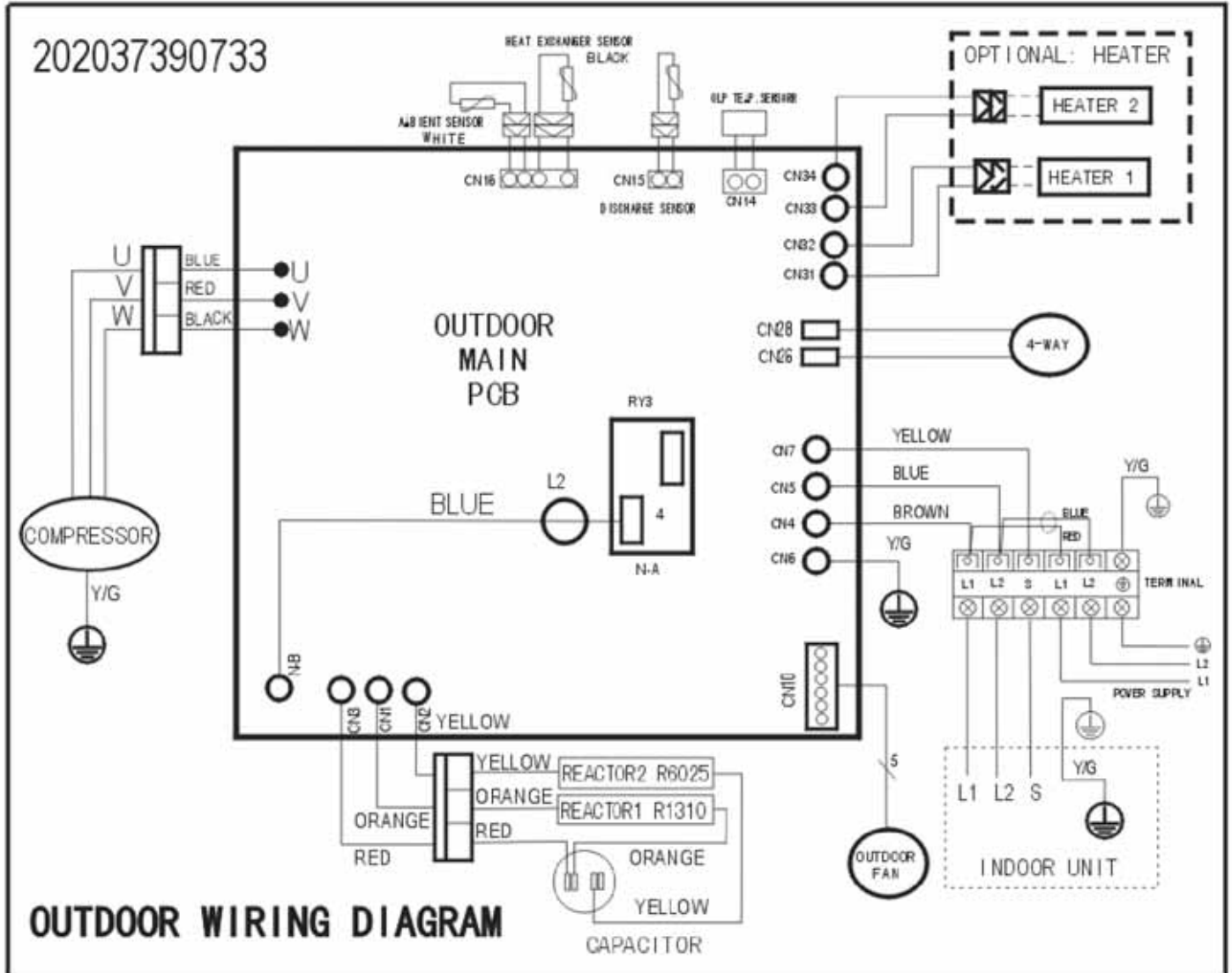
WIRING DIAGRAMS

19 SEER

WARNING

HIGH VOLTAGE!
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

MSH - 12,000 (230V) - Heating Only



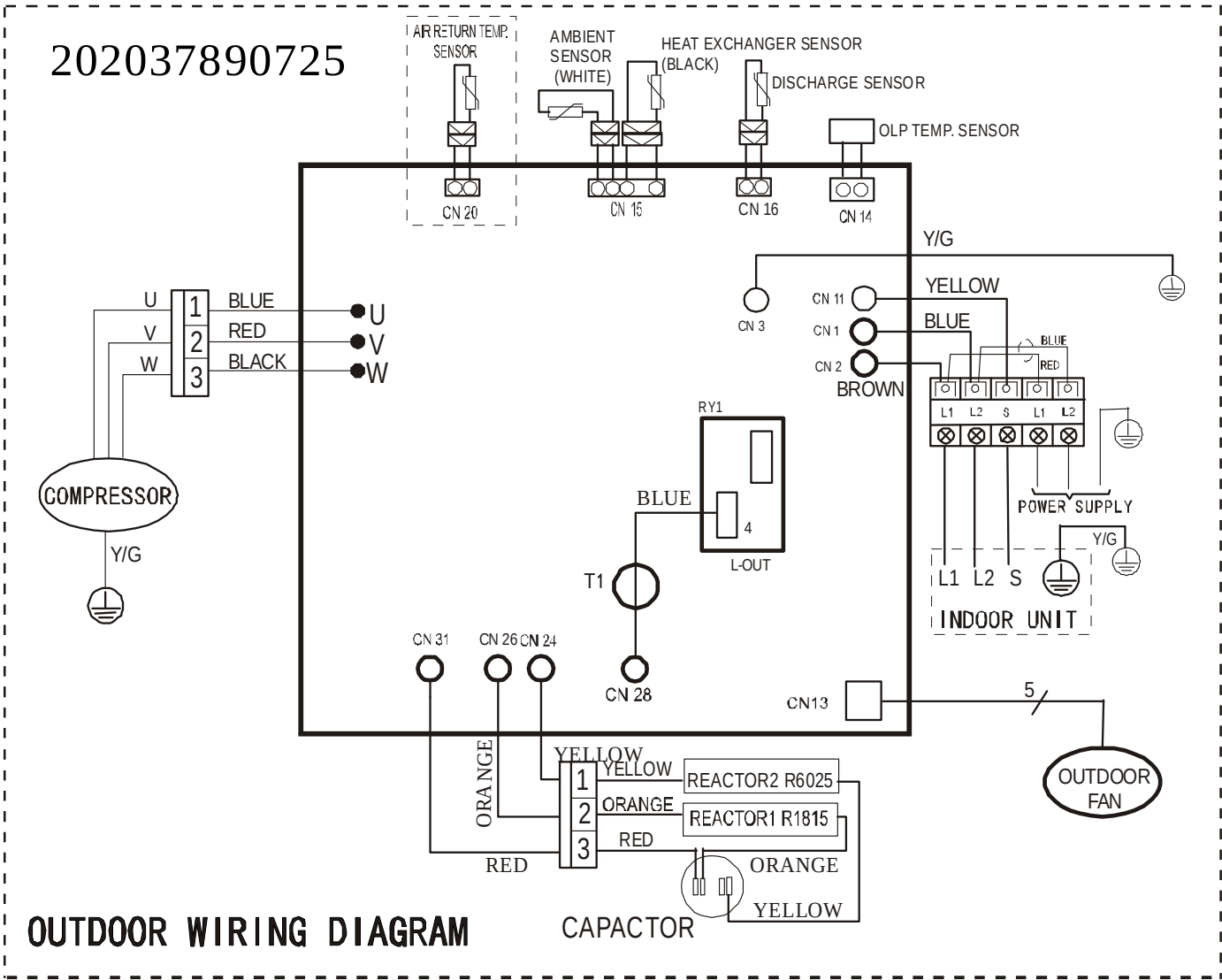
Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

**WARNING**

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSC - 18,000 (230V) - Cooling Only



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

WIRING DIAGRAMS

19 SEER

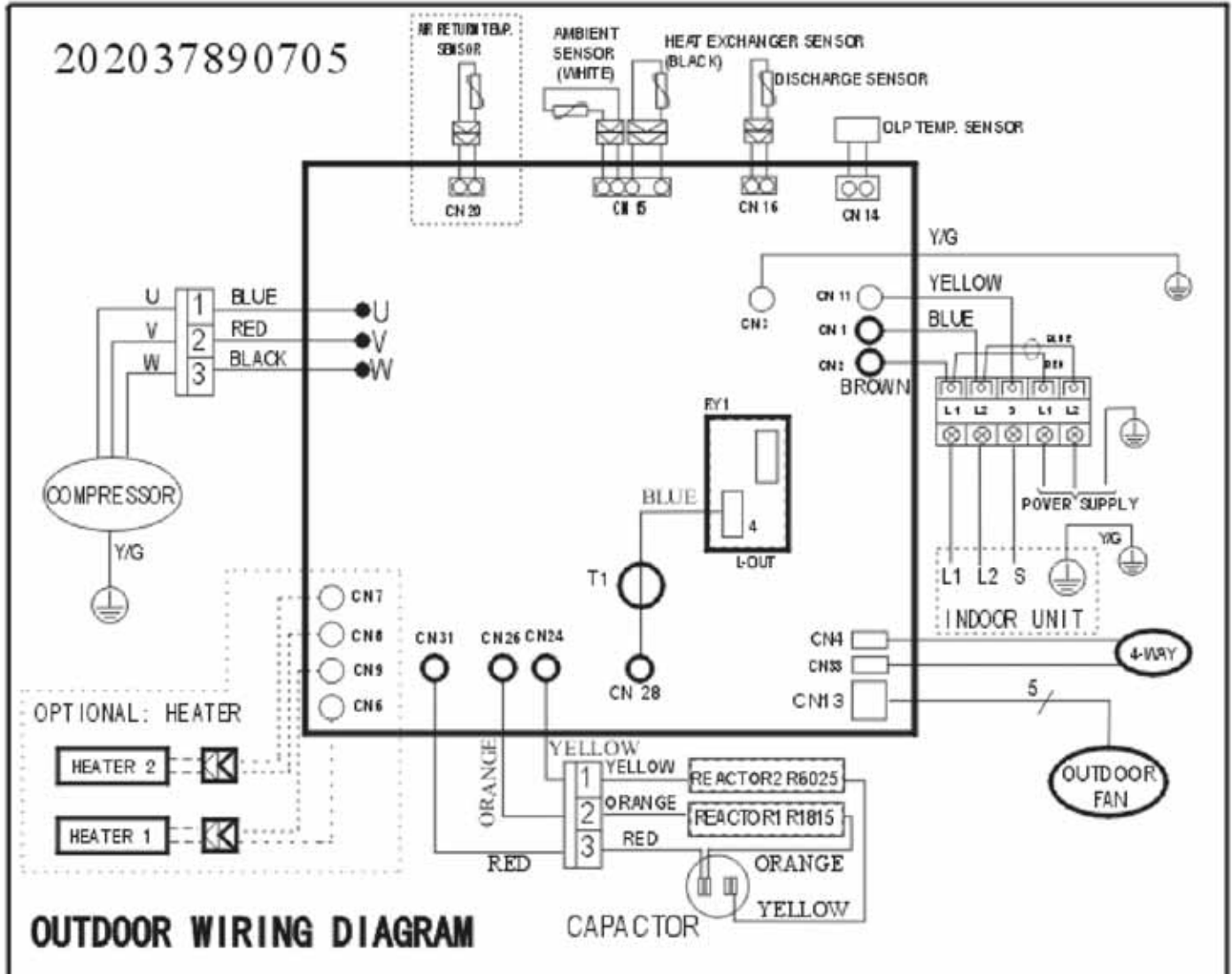


WARNING

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSH - 18,000 (230V) - Heating Only



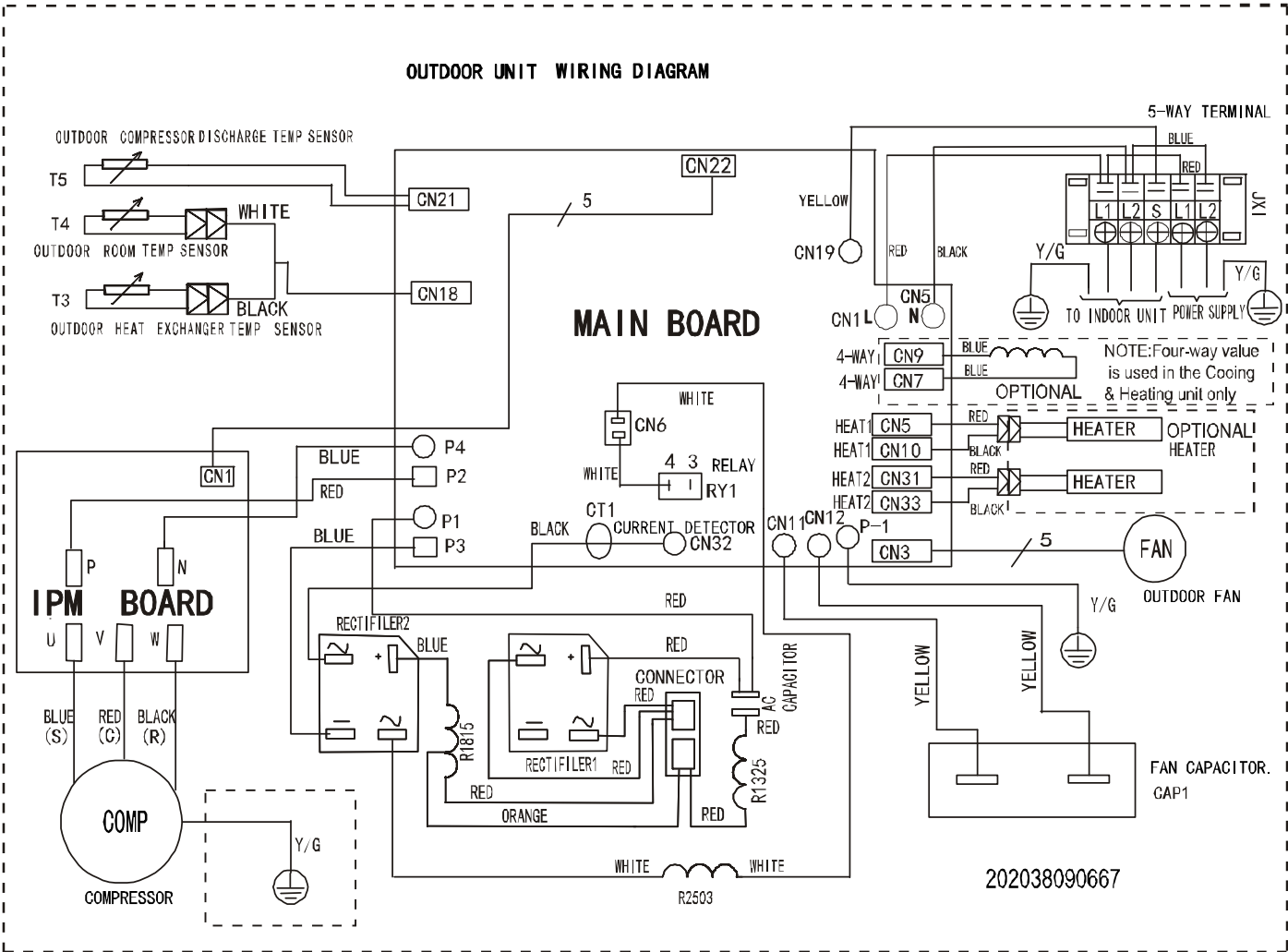
Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.

**WARNING**

HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



MSH/MSH - 24,000 (230V) - Cooling & Heating



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.