



ProDirect™ Series A/C Condenser PRODUCT SPECIFICATIONS

Dimensions		HAC14018	HAC14024	HAC14030	HAC14036	HAC14042	HAC14048	HAC14060
Unit (W x H x D)	in	21 ⁷ / ₈ x 24 ¹⁵ / ₁₆ x 21 ⁷ / ₈	21 ⁷ / ₈ x 24 ¹⁵ / ₁₆ x 21 ⁷ / ₈	21 ⁷ / ₈ x 24 ¹⁵ / ₁₆ x 21 ⁷ / ₈	29 ¹ / ₈ x 24 ¹⁵ / ₁₆ x 29 ¹ / ₈	29 ¹ / ₈ x 33 ³ / ₁₆ x 29 ¹ / ₈	29 ¹ / ₈ x 33 ³ / ₁₆ x 29 ¹ / ₈	29 ¹ / ₈ x 33 ³ / ₁₆ x 29 ¹ / ₈
	mm	554 x 633 x 554	554 x 633 x 554	554 x 633 x 554	740 x 633 x 740	740 x 843 x 740	740 x 843 x 740	740 x 843 x 740
Packing	in	23 ² / ₅ x 26 ¹ / ₁₀ x 23 ² / ₅	23 ² / ₅ x 26 ¹ / ₁₀ x 23 ² / ₅	23 ² / ₅ x 26 ¹ / ₁₀ x 23 ² / ₅	30 ¹ / ₁₀ x 26 ¹ / ₁₀ x 30 ¹ / ₁₀	30 ¹ / ₁₀ x 34 ¹ / ₂ x 30 ¹ / ₁₀	30 ¹ / ₁₀ x 34 ¹ / ₂ x 30 ¹ / ₁₀	30 ¹ / ₁₀ x 34 ¹ / ₂ x 30 ¹ / ₁₀
	mm	575 x 660 x 575	575 x 660 x 575	575 x 660 x 575	760 x 660 x 760	760 x 875 x 760	760 x 875 x 760	760 x 875 x 760
Weight (net/gross)	lbs	101/106	115/119	128/134	157/163	183/192	185/196	207/216
	kg	46/48	52/54	58/61	71/74	83/87	84/89	94/98

Electrical	Unit	HAC14018	HAC14024	HAC14030	HAC14036	HAC14042	HAC14048	HAC14060
Outdoor Power Supply	V/Ph/Hz	230V/1N/60Hz	230V/1N/60Hz	230V/1N/60Hz	230V/1N/60Hz	230V/1N/60Hz	230V/1N/60Hz	230V/1N/60Hz
Max Input Consumption	W	1843.75	2450.00	3075.00	3537.50	4312.50	5110.00	6150.00
Min Circuit Ampacity (MCA)	A	9.50	13.50	16.00	18.00	22.00	26.50	33.00
Max Overcurrent Protection (MOP)	A	15.00	20.00	25.00	30.00	35.00	45.00	50.00
Max Current	A	8.44	11.21	14.07	16.19	19.74	23.39	28.15

Compressor	Unit	HAC14018	HAC14024	HAC14030	HAC14036	HAC14042	HAC14048	HAC14060
Brand		Highly	Highly	Highly	Highly	LG	LG	LG
Model		ASL145DG-C7EU	ASH201DG-C8LU1L	ASH239DG-C8DU	ASH280DG-C8DU	ABG036KAC	ABG042KAC	ABG051KAC
Type		Rotary	Rotary	Rotary	Rotary	Scroll	Scroll	Scroll
Capacity	W	4240	5970	7055	8260	10551	12309	14974
Input	W	1390	1950	2290	2700	3429	3962	4722
Rated Current (RLA)	A	6.10	8.70	10.20	11.90	15.2	17.3	21.0
Locked Rotor Amp (LRA)	A	33	44	56	60	112	108	128
Thermal Protector	uf	40	40	55	70	45	70	70
Refrigerant Oil	ml	480	570	570	570	1280	1280	1280

Fan Motor		HAC14018	HAC14024	HAC14030	HAC14036	HAC14042	HAC14048	HAC14060
Brand		Chigo	Chigo	Chigo	Chigo	Chigo	Xinjun	Xinjun
Model		S.TB-DQ-YDK-60-6P2-AL	S.TB-DQ-YDK-85-6P2-AL	S.TB-DQ-YDK-85-6P2-AL	S.TB-DQ-YDK-110-8P2-AL	S.TB-DQ-YDK-110-8P2-AL	S.TB-DQ-YDK-230-6P2	S.TB-DQ-YDK-230-6P2
Input	W	145	178	178	207	207	510	510
Output	W	60	85	85	110	110	230	230
Capacitor	μF	6.00	6.00	6.00	6.00	6.00	12.00	12.00
Speed	rpm	870	970	970	850	850	1095	1095

Coil		HAC14018	HAC14024	HAC14030	HAC14036	HAC14042	HAC14048	HAC14060
Number of Rows		1	2	2	2	2	2	2.7
Fin Spacing	in	0.055	0.055	0.055	0.055	0.055	0.055	0.055
Fin Material		non-Hydrophilic Aluminum Fin	non-Hydrophilic Aluminum Fin	non-Hydrophilic Aluminum Fin	non-Hydrophilic Aluminum Fin	non-Hydrophilic Aluminum Fin	non-Hydrophilic Aluminum Fin	non-Hydrophilic Aluminum Fin
Tube Outside Diameter	in	Φ 0.276	Φ 0.276	Φ 0.276	Φ 0.276	Φ 0.276	Φ 0.276	Φ 0.276
Tube Material		Inner Grooved	Inner Grooved	Inner Grooved	Inner Grooved	Inner Grooved	Inner Grooved	Inner Grooved
Coil (L x H x W)	in	56.22 x 23.15 x 0.53	56.22 x 23.15 x 1.05	56.22 x 23.15 x 1.05	84.65 x 23.15 x 1.05	84.65 x 31.48 x 1.05	84.65 x 31.48 x 1.05	84.65 x 31.48 x 1.05
Number of Circuit		3	4	4	6	8	8	8

Refrigerant		HAC14018	HAC14024	HAC14030	HAC14036	HAC14042	HAC14048	HAC14060
Type		R-410A	R-410A	R-410A	R-410A	R-410A	R-410A	R-410A
Liquid Side	in	Φ 3/8	Φ 3/8	Φ 3/8	Φ 3/8	Φ 3/8	Φ 3/8	Φ 3/8
Gas Side	in	Φ 3/4	Φ 3/4	Φ 3/4	Φ 3/4	Φ 3/4	Φ 7/8	Φ 7/8
Max Pipe Length	ft (m)	50 (15)	50 (15)	50 (15)	50 (15)	66 (20)	66 (20)	66 (20)
Max Level Difference	ft (m)	26 (8)	26 (8)	26 (8)	26 (8)	33 (10)	33 (10)	33 (10)
Design Pressure	psi	580/174	580/174	580/174	580/174	580/174	580/174	580/174
Max Pressure	psi	609	609	609	609	609	609	4.20



PRODIRECT™
SERIES





BENEFITS & FEATURES

R410a environmentally friendly refrigerant.

Painted galvanized steel cabinet.

24V low voltage control.

AHRI Certified & ETL Listed.

Strong Scroll compressor with quick reactivity and stable operation.

Protective louvered steel coil guard.

Pressure and Temperature protection sensors to prevent damage.

Goldfin™ Corrosion protection.

Intelligent defrost programs that are automatic.

Condenser coils constructed with copper tubing and enhanced aluminum fins.

Wide operation temperature range.



Insulated cabinet

Galvanized steel with paint on all panels. Thermal insulator cover all inside panels to reduce heat and cooling losses and prevent condensed water accumulation.



Coil

"A" shape coils, constructed with copper tubing and enhanced aluminum fins.



Motor & Blower

Direct drive motors, 3-speed, provide selections of air flow to meet desired applications.



Expansion device

Use piston as expansion device



Filter optional

Detachable air filter for cleaning or renewal.



Multi-position installation

Versatile 4-way convertible design for upflow, downflow, and horizontal airflow.

PRODIRECT™ SPECIFICATIONS

INDOOR AIR HANDLER								
Model	Cooling Capacity (KBTu/h)	SEER	EER	External Static pressure(pa)	Air flow (CFM)	Net Dimension (WxHxD)(inch)	Packing Dimension (WxHxD)(inch)	Indoor Noise Level dB(A)
HAH14018	18.0	14	11.7	25	802/723/650	20x46x22	23x48x26	31-40
HAH14024	24.0	14	12.2	25	938/804/738	20x46x22	23x48x26	37-42
HAH14030	30.0	14	11.7	37	1204/1060/919	20x46x22	23x48x26	42-48
HAH14036	36.0	14	11.7	37	1376/1235/1161	20x46x22	23x48x26	47-51
HAH14042	42.0	14	11.7	37	1562/1385/1208	20x46x22	23x48x26	49-52
HAH14048	48.0	14	11.2	50	1695/1574/1434	22x54x25	26x55x28	51-54
HAH14060	56.5	14	11.2	50	1695/1574/1434	22x54x25	26x55x28	51-55

OUTDOOR UNIT									
Model	Cooling Capacity (KBTu/h)	SEER	EER	Net Dimension (WxHxD)(inch)	Liquid side (inch)	Gas side (inch)	Max. Refrigerant pipe length(ft)	Max. Difference in level(ft)	Indoor Noise Level dB(A)
HAC14018	18.0	14	11.7	22x25x22	Φ3/8	Φ3/4	82	33	57
HAC14024	24.0	14	12.2	22x25x22	Φ3/8	Φ3/4	82	33	60
HAC14030	30.0	14	11.7	29x33x29	Φ3/8	Φ3/4	82	33	60
HAC14036	34.5	14	11.7	29x33x29	Φ3/8	Φ3/4	82	33	60
HAC14042	42.0	14	11.7	29x33x29	Φ3/8	Φ3/4	82	33	60
HAC14048	48.0	14	11.2	29x33x29	Φ3/8	Φ7/8	82	33	63
HAC14060	57.0	14	11.2	29x33x29	Φ3/8	Φ7/8	82	33	63

Model	Cooling/Heating Capacity (KBTu/h)	SEER	EER	Net Dimension (WxHxD)(inch)	Liquid side (inch)	Gas side (inch)	Max. Refrigerant pipe length(ft)	Max. Difference in level(ft)	Indoor Noise Level dB(A)
HHP14018	17.6/16.0	14	11.7	22x25x22	Φ3/8	Φ3/4	82	33	60
HHP14024	23.4/22.0	14	12.2	22x25x22	Φ3/8	Φ3/4	82	33	60
HHP14030	28.6/27.6	14	11.7	29x33x29	Φ3/8	Φ3/4	82	33	61
HHP14036	34.0/33.8	14	11.7	29x33x29	Φ3/8	Φ3/4	82	33	61
HHP14042	40.5/44.0	14	11.7	29x33x29	Φ3/8	Φ3/4	82	33	63
HHP14048	46.0/46.0	14	11.2	29x33x29	Φ3/8	Φ7/8	82	33	63
HHP14060	56.5/55.0	14	11.2	29x33x29	Φ3/8	Φ7/8	82	33	63





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***Display Images for demonstrative purposes only. Actual images during product use may vary.**

NOTICE: MRCOOL® products must be installed in accordance with all applicable local, state and federal codes and regulations. Unless explicitly stated otherwise, installation must be completed by a licensed / certified HVAC technician. ALL electrical connections to a power source must be performed by a licensed electrician and comply with local, state and federal electrical codes and regulations.



Owner & Installation Manual



MRCOOL®

COMFORT MADE SIMPLE

PRODIRECT™ SERIES

Split System Heat Pump & Air Conditioner

13 -14 SEER 1.5-5 Tons Model

HHP140* & HAC140*

Due to updates and constantly improving performance, the information and instructions within this manual are subject to change without notice. Please visit www.mrcool.com/documentation to ensure you have the latest version of this manual.

Version Date: 6-25-21

Thank you for choosing MRCOOL. Please read this manual carefully before installation and keep it for future reference.

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RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION

 **WARNING**

These instructions are intended as an aid for qualified and licensed service personnel for proper installation, adjustment, and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instructions may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death.



DO NOT DESTROY THIS MANUAL

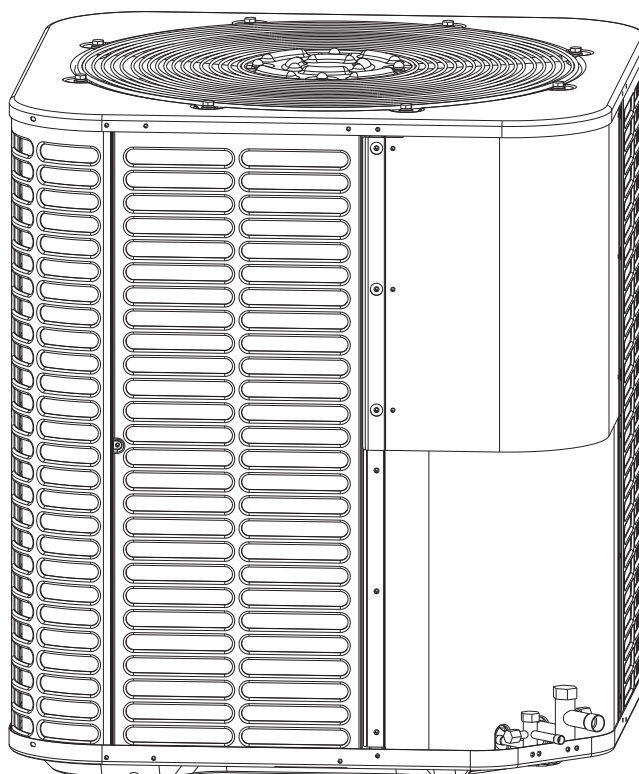
Please read carefully and keep in a safe place for future reference by a serviceman.

INSTALLATION AND OWNER'S MANUAL

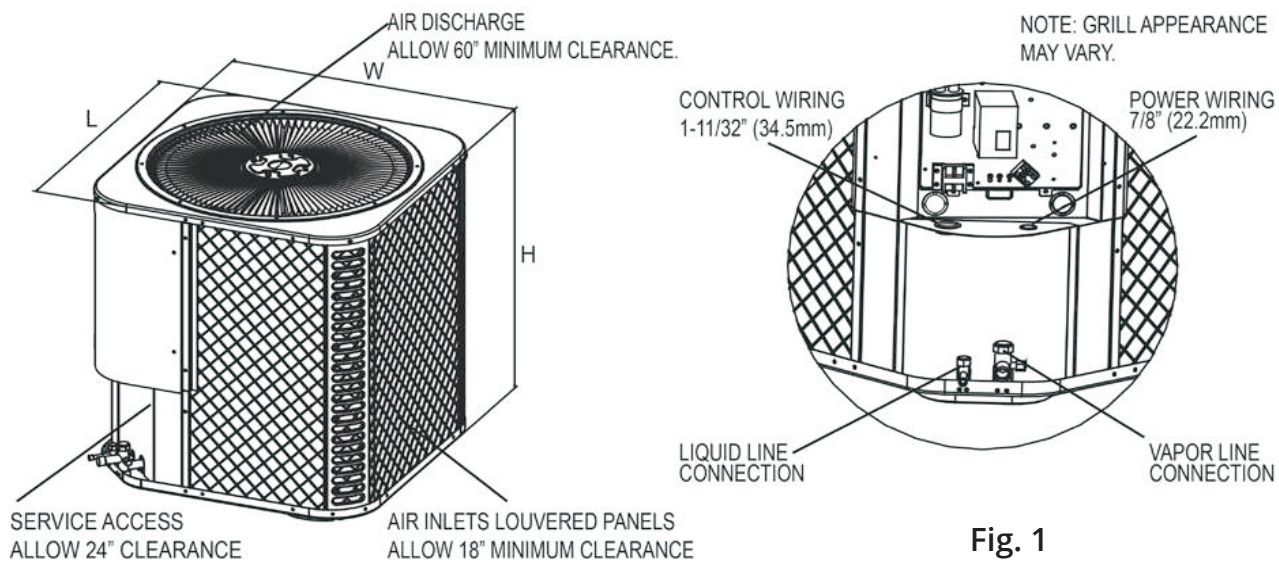
OUTDOOR UNIT MODELS

Table of Contents

1 DIMENSIONS	2
2 SERVICE SPACE	3
3 PIPING DIAGRAMS	4
4 WIRING DIAGRAMS	6
5 ELECTRIC CHARACTERISTICS	7
6 OPERATION LIMITS	8
7 INSTALLATION PROCEDURE	9
8 LOCATION SELECTION	10
9 OUTDOOR UNIT INSTALLATION (TOP DISCHARGE UNIT)	11
10 REFRIGERANT PIPE INSTALLATION	13
11 VACUUM DRYING AND LEAKAGE CHECKING	15
12 ADDITIONAL REFRIGERANT CHARGE	16
13 PIPE INSULATION	17
14 ELECTRICAL WIRING INSTALLATION & REQUIREMENTS	18
15 TEST OPERATION	20
16 TROUBLESHOOTING	21



1. Dimensions



Unit Model	Dimensions (Inches)			Refrigerant Connection Service Valve Size	
	"H" in [mm]	"W" in [mm]	"L" in [mm]	Liquid in	Vapor in
18K	25 [633]	21-3/4 [554]	21-3/4 [554]	3/8	3/4
24K	25 [633]	21-3/4 [554]	21-3/4 [554]	3/8	3/4
30K	25 [633]	21-3/4 [554]	21-3/4 [554]	3/8	3/4
36K	25 [633]	29-1/7 [740]	29-1/7 [740]	3/8	3/4
42K	32-7/8 [835]	29-1/7 [740]	29-1/7 [740]	3/8	3/4
48K	32-7/8 [835]	29-1/7 [740]	29-1/7 [740]	3/8	7/8
60K	32-7/8 [835]	29-1/7 [740]	29-1/7 [740]	3/8	7/8

Table - 1

2. Service Space

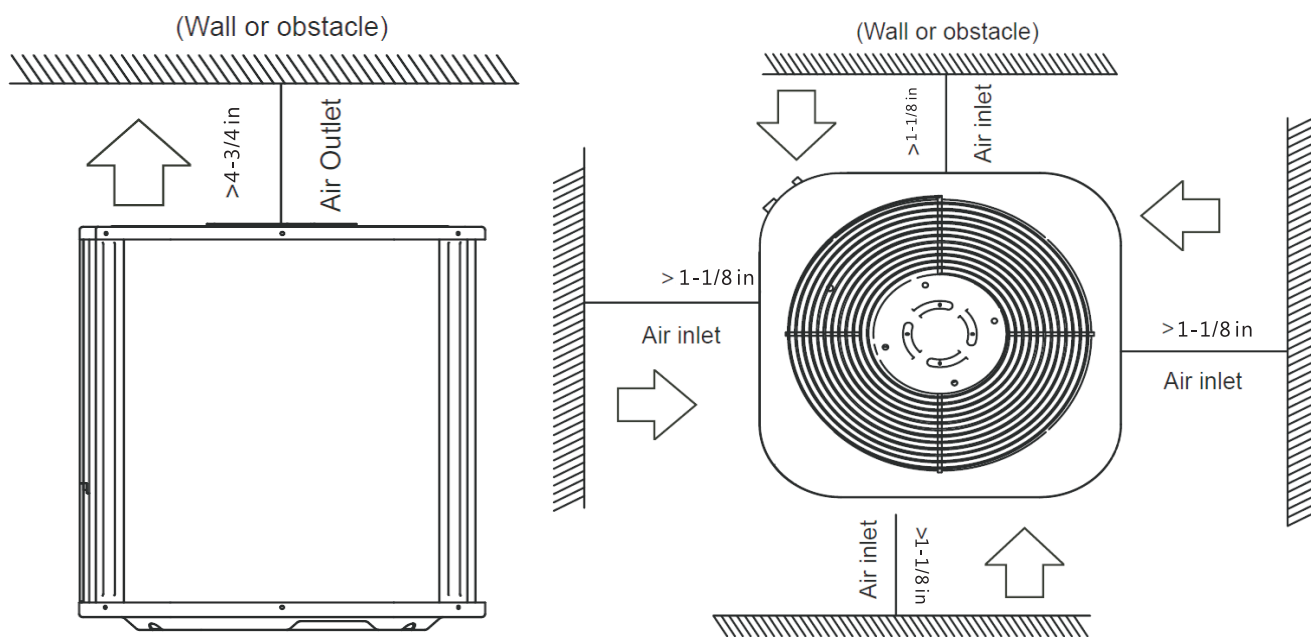


Fig. 2

3. Piping Diagrams

Applicable for 18k, 24k, 30k, 36k cooling only type

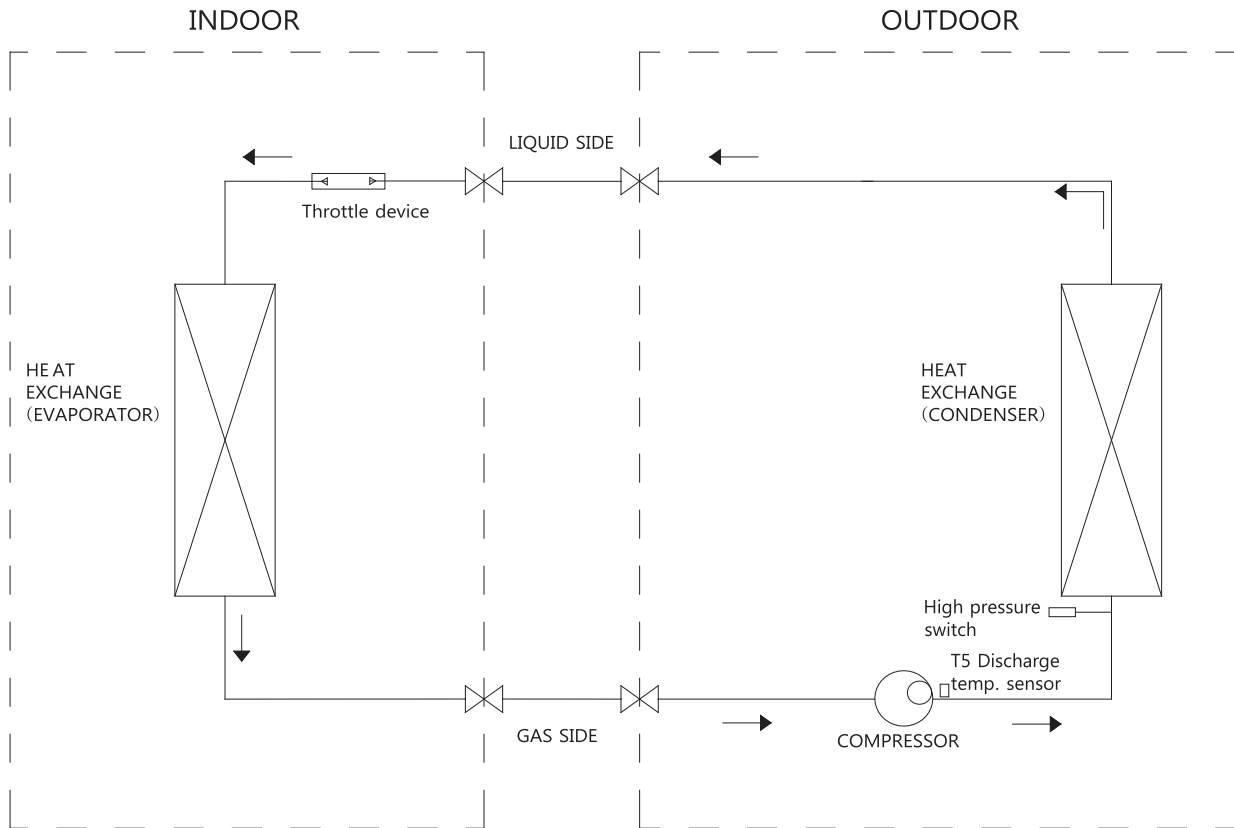


Fig. 3-1

Applicable for 18k, 24k, 30k, 36k cooling & heating type

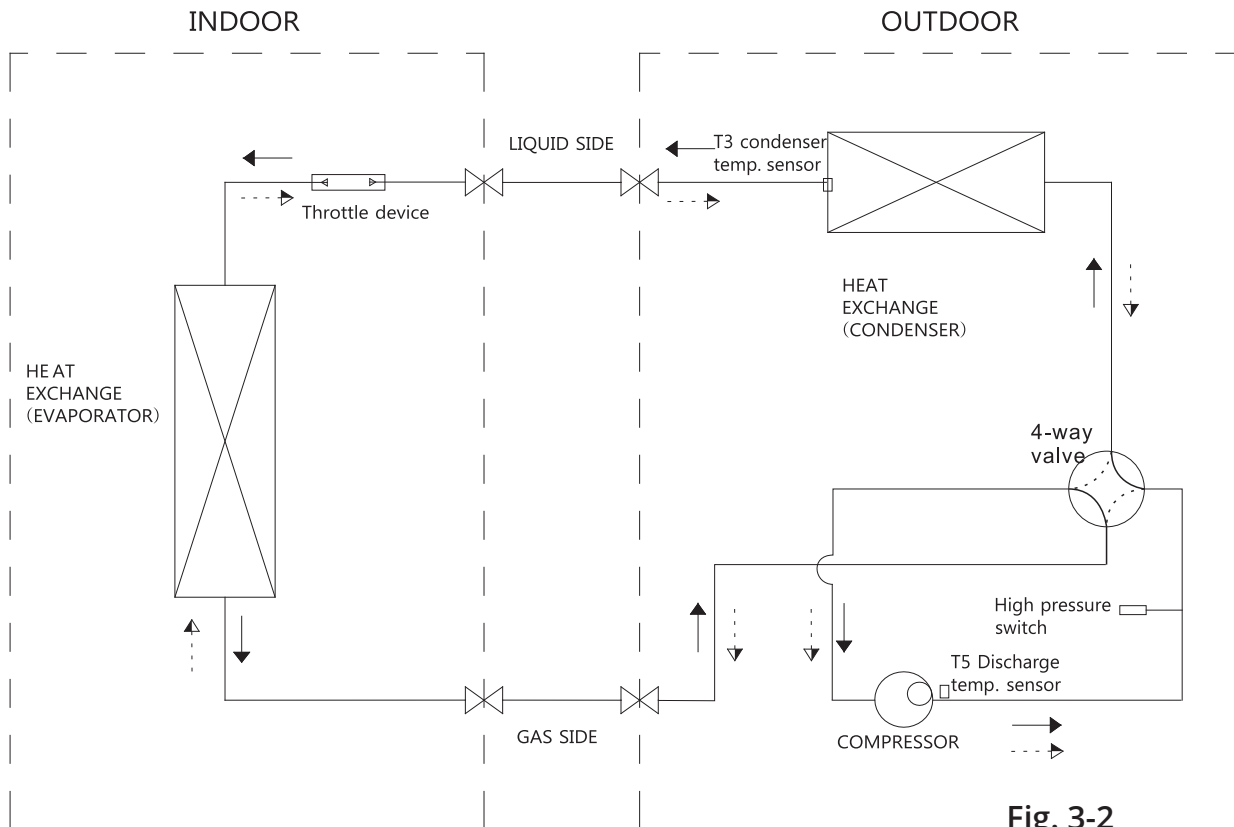


Fig. 3-2

Applicable for 42k, 48k, 60k cooling only type

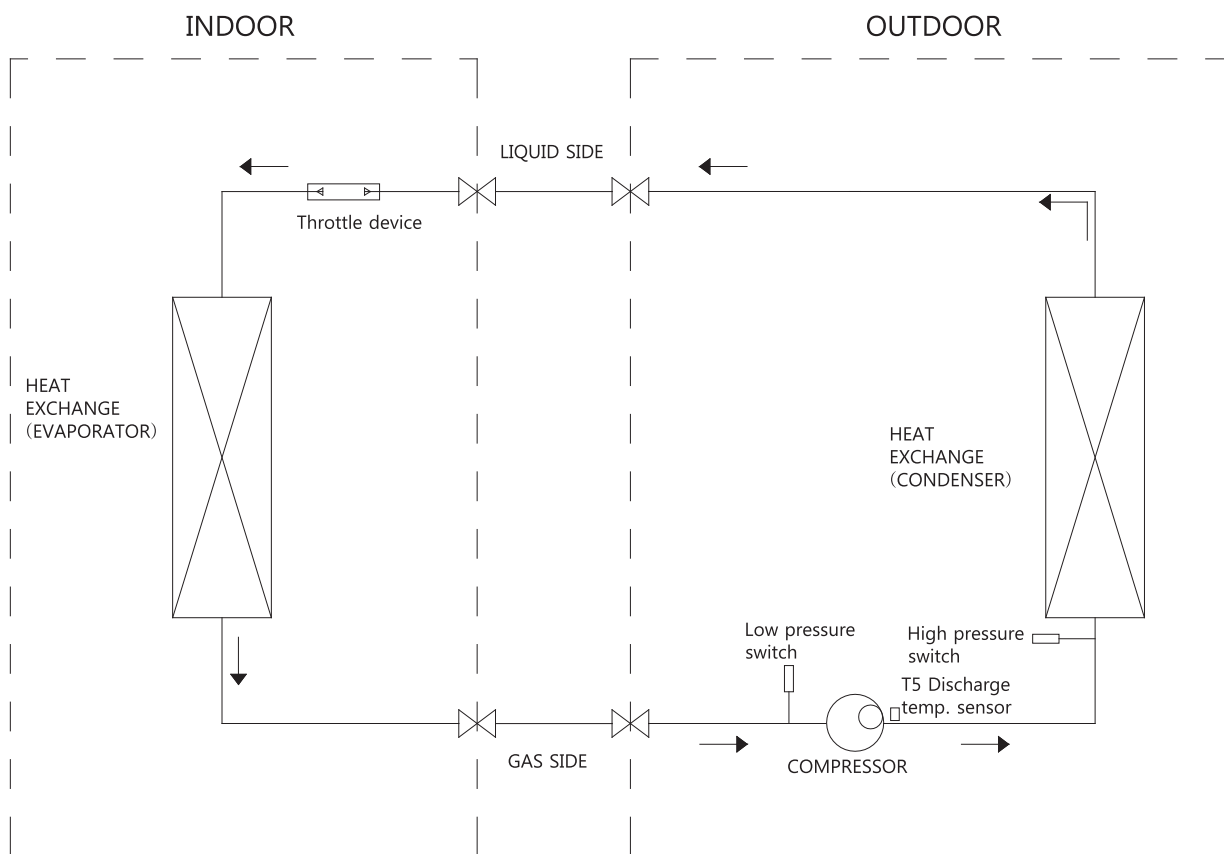


Fig. 3-3

Applicable for 42k, 48k, 60k cooling & heating type

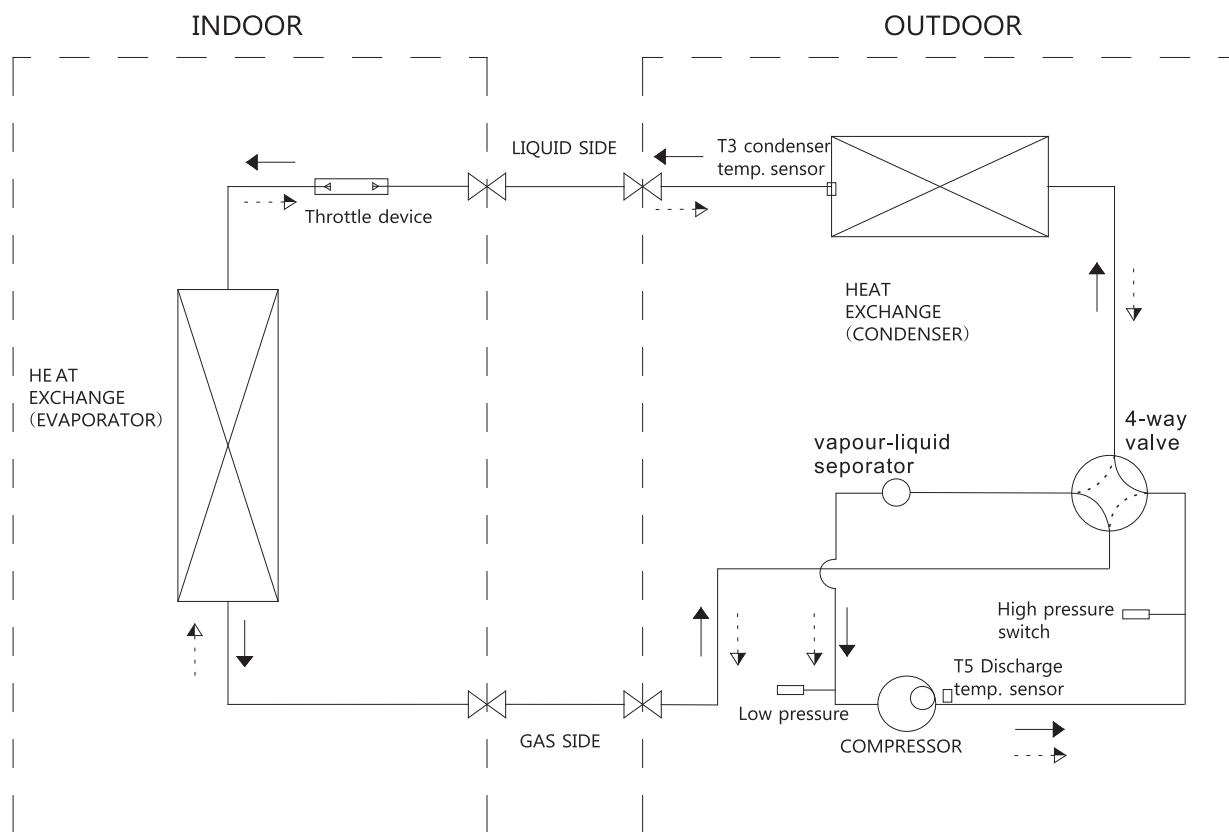
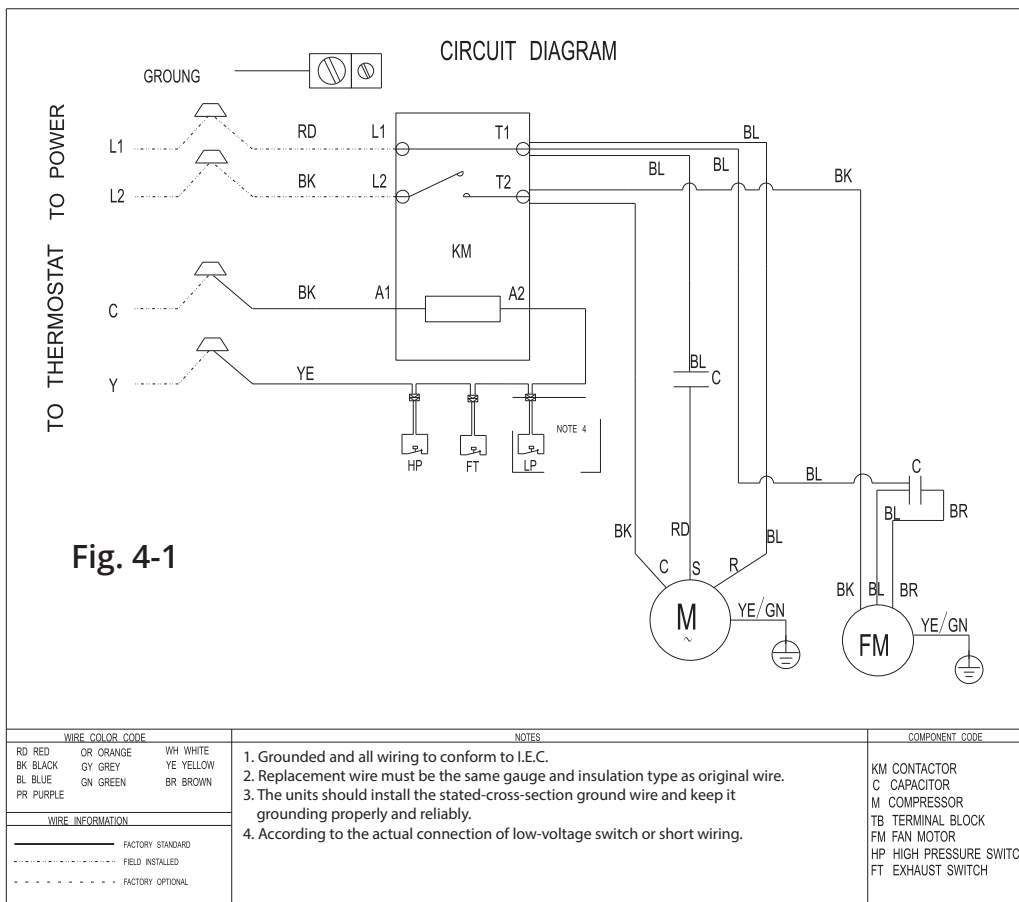


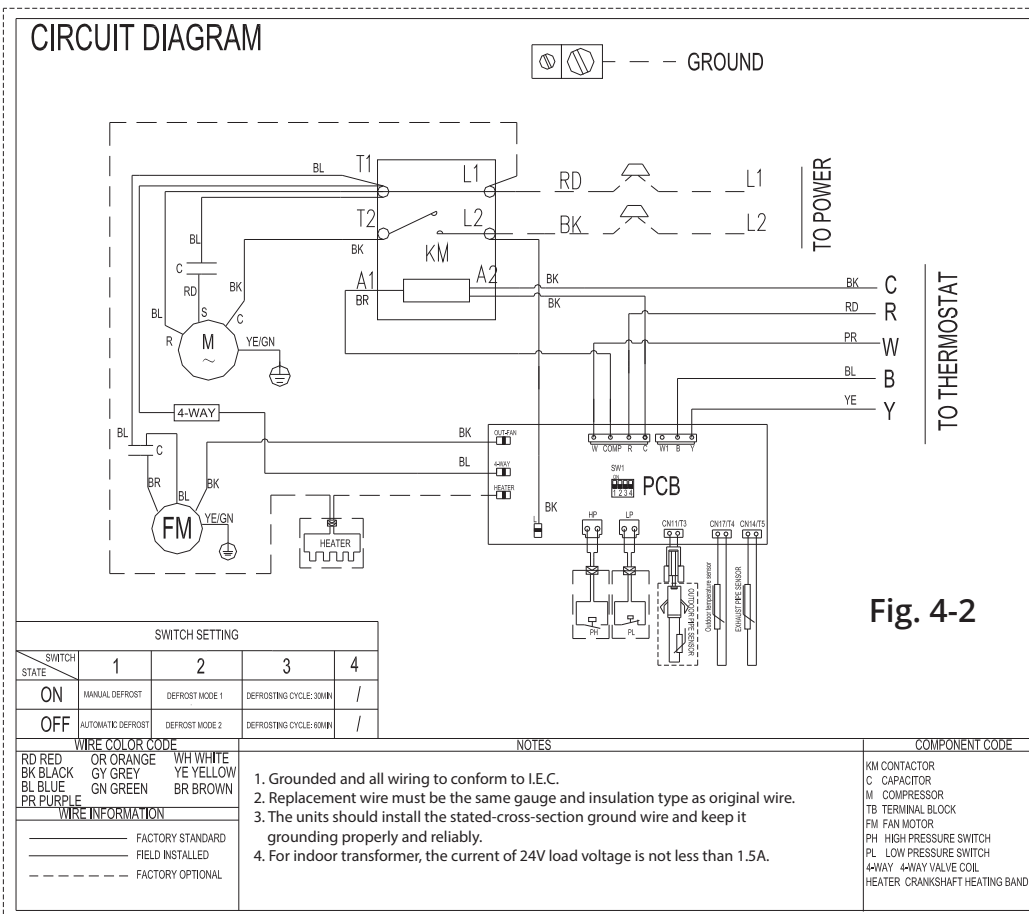
Fig. 3-4

4. Wiring Diagrams

Applicable for 18k, 24k, 30k, 36k, 42k, 48k, 60k cooling only type



Applicable for 18k, 24k, 30k, 36k, 42k, 48k, 60k cooling & heating type



5. Electrical Characteristics

Model	Power Supply				
	Hz	Phase	Voltage	Min.	Max.
18K	60	1	220-230V	198V	242V
24K	60	1	220-230V	198V	242V
30K	60	1	220-230V	198V	242V
36K	60	1	220-230V	198V	242V
42K	60	1	220-230V	198V	242V
48K	60	1	220-230V	198V	242V
60K	60	1	220-230V	198V	242V

Table - 2

6. Operation Limits

Table - 3

Mode \ Temperature	Cooling operation	Heating operation
Room temperature	63°F~86°F (17°C~30°C)	63°F~86°F (17°C~30°C)
Outdoor temperature	64°F~109°F (18°C~43°C)	19°F~75°F (-7°C~24°C)

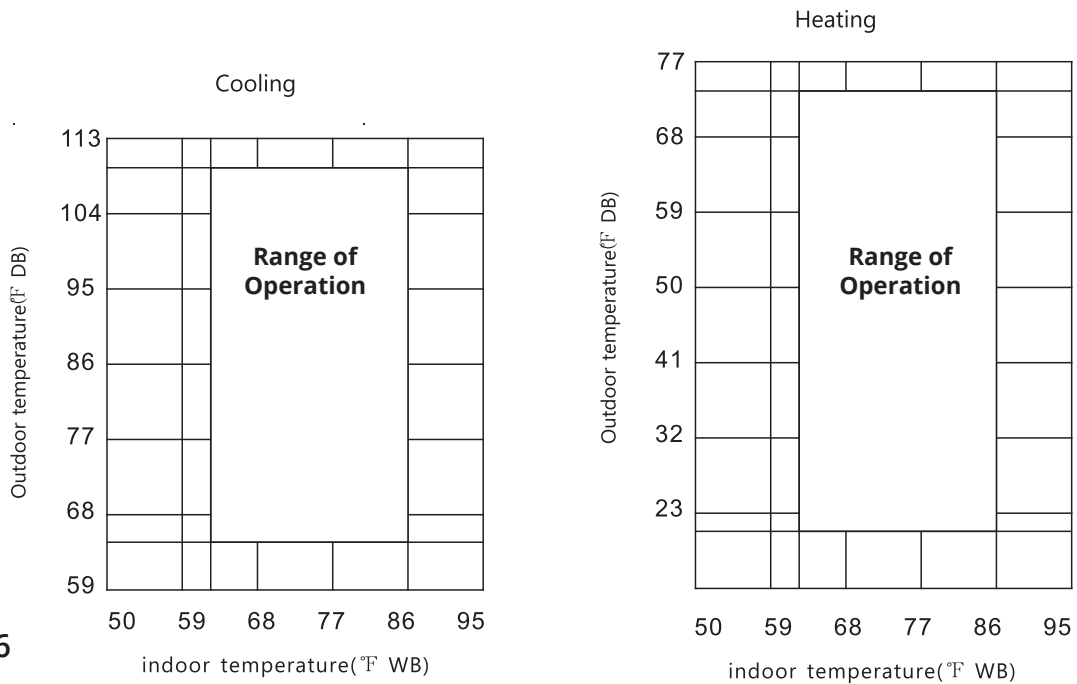
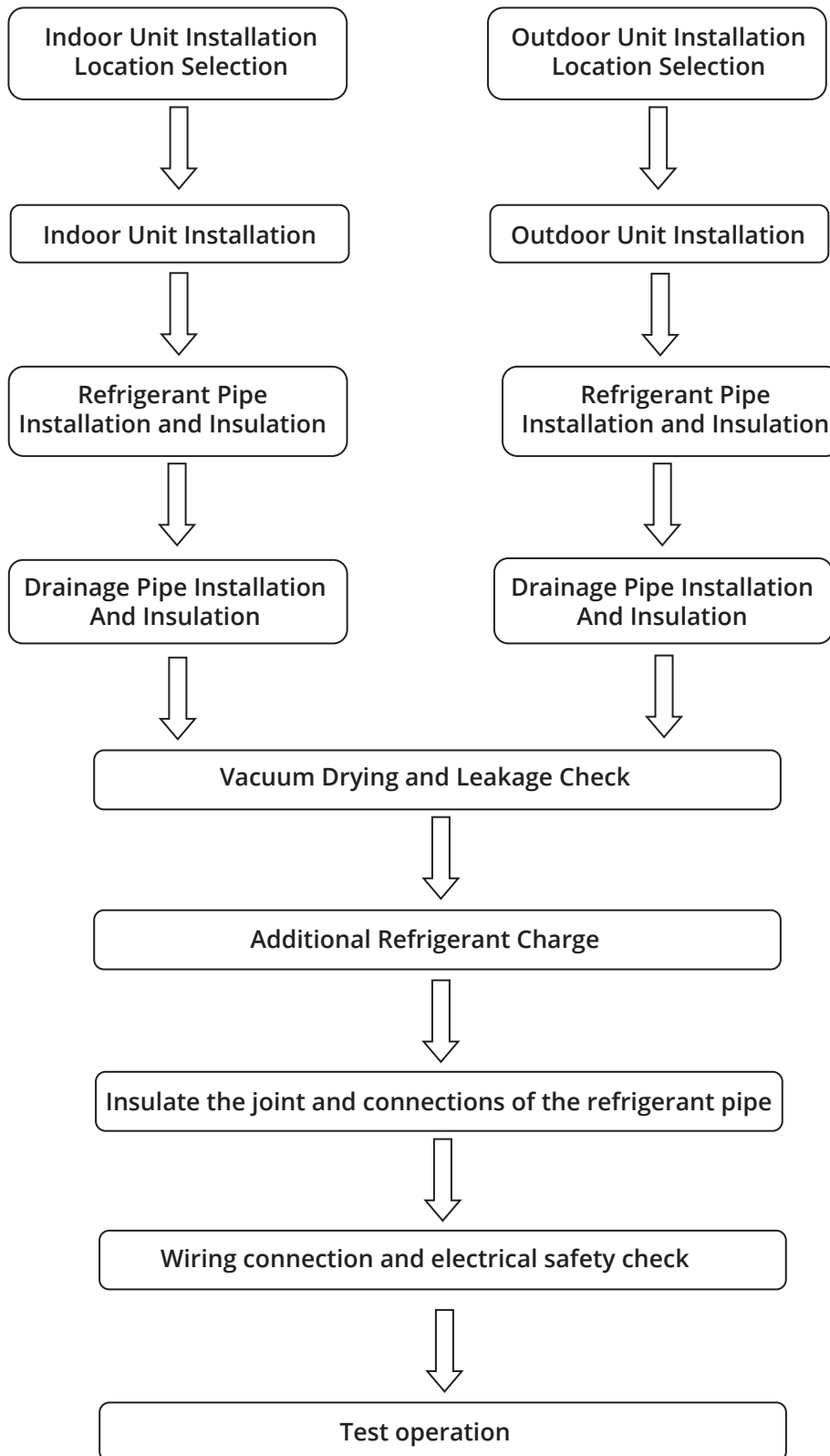


Fig. 6

⚠ WARNING

When the ambient temperature is more than 109°, the restart time may take 15-20 minutes. It is suggested to install a booster in the outdoor unit (18K, 24K, 30K, and 36K units only) to shorten the restart time. In the case of high and low pressure imbalance, a booster can increase the starting torque of the compressor allowing it to start normally.

7. Installation Procedure



8. Location Selection

8.1 Indoor unit location selection

- The location should easily support the indoor unit's weight.
- The location is easily accessible for indoor unit installation and inspection.
- The location can accommodate horizontal indoor unit installation.
- The location allows easy water drainage.
- The location allows the unit to easily connect with the outdoor unit.
- The location offers sufficient air circulation in the room.
- There should not be any heat source or steam near the unit.
- There should not be any oil or gas near the unit.
- There should not be any corrosive materials near the unit.
- There should not be any salty air near the unit.
- There should not be strong electromagnetic waves near the unit.
- There should not be inflammable materials near the unit.
- There should not be any strong voltage vibration.

8.2 Outdoor unit location selection

- The location should easily support the outdoor unit's weight.
- The location should put the outdoor unit as close to the indoor unit as possible.
- The piping length and height drop can not exceed the allowable value (**Reference Table 4**).
- Select a location where any noise, vibration, or outlet air will not disturb the residents of surrounding homes.
- There is enough room for installation and maintenance.
- The air outlet and the air inlet are not impeded, and do not face any sort of strong wind.
- Select a location where pipes and cables will be easy to install.
- There is no danger of fire from potential leakage of inflammable gas.
- The location should be a dry and well ventilated space.
- The location and support should allow the unit to sit flat and horizontal.
- Do not install the outdoor unit in a dirty or severely polluted place, in order to avoid any blockage of the heat exchanger contained within the outdoor unit.
- If a protective structure is built over the unit to prevent direct sunlight, rain exposure, direct strong wind, snow, or the accumulation of other types of debris, make sure the heat that radiates from the condenser is not restricted.

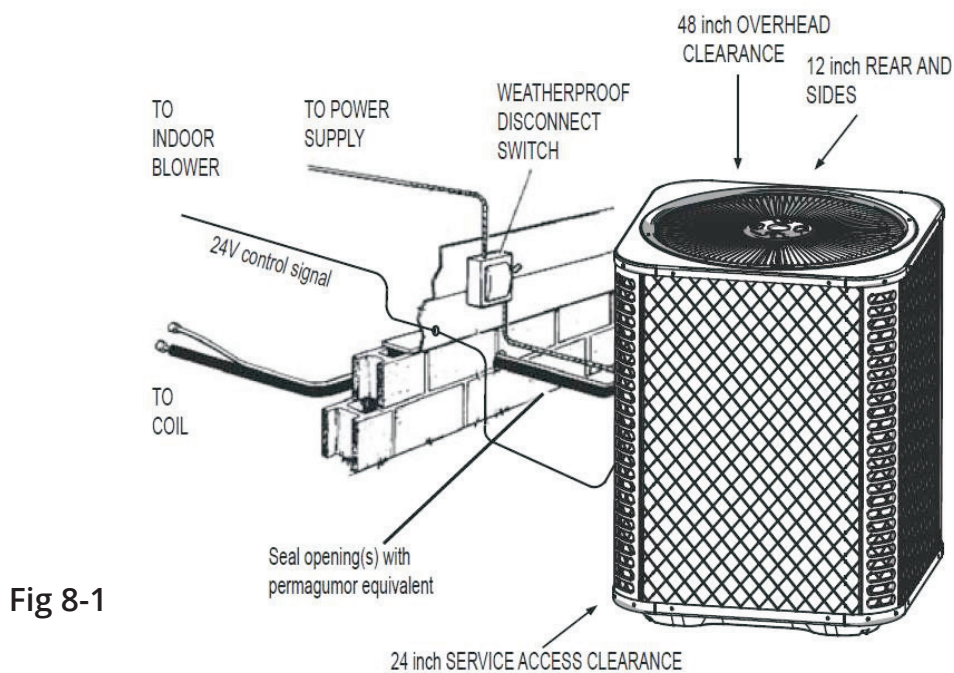


Fig 8-1

NOTE: All outdoor wiring must be weatherproof

9. Outdoor Unit Installation (Top Discharge Unit)

Location selection

Before starting the installation, find and select a suitable location for both the indoor and outdoor unit using the guidelines listed previously. Observe all limitations and clearance requirements. The outdoor unit must have sufficient clearance for air to enter and discharge from the condenser coil, as well as for service access.

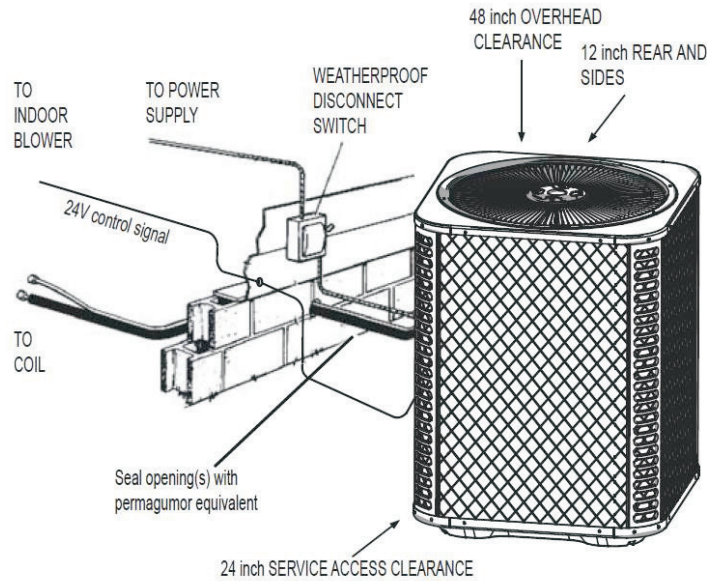


Fig 9-1

NOTE: All outdoor wiring must be weatherproof

Note: For multiple unit installations, units must be spaced a minimum of 18 in (457 mm) apart. (Coil face to coil face.) If the unit is to be installed on a roof or a black-topped ground area where it will be exposed to the heat of the sun, the unit should be raised sufficiently above the roof or ground to avoid the unit from taking in the accumulated heat of those surfaces. Provide adequate structural support.

Service space for outdoor unit (Wall or obstacle)

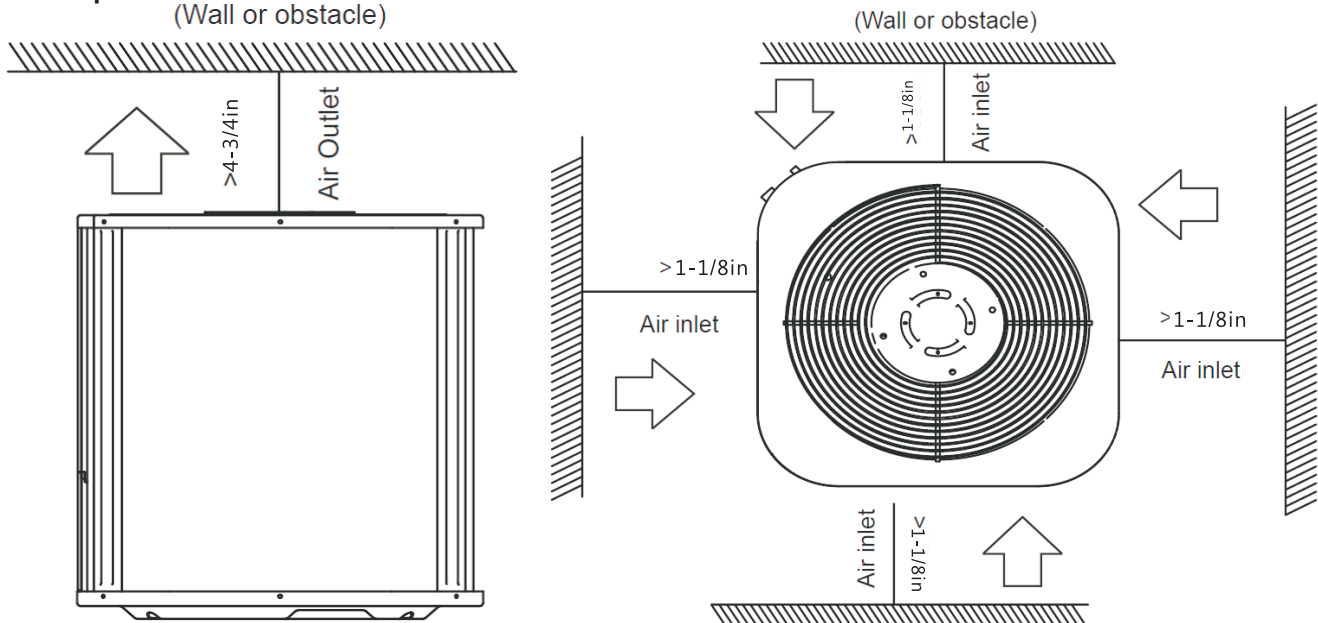


Fig 9-2

Install the Unit

The unit may be installed at ground level on a solid base that will not shift or settle, as unnecessary movement could cause strain on the refrigerant lines and possible leaks to occur. Maintain the clearances shown in Fig.9-2 and install the unit in a level position. Normal operating sound levels may be undesirable if the unit is placed directly under windows of certain rooms (bedrooms, study, etc.). The top of unit discharge area must be unrestricted for a minimum 6 feet above the unit.

Warning: The outdoor unit should not be installed in an area where excessive mud or ice could accumulate, as this could cause personal injury. Elevate the unit sufficiently to prevent any blockage to the air entrances from excessive snow or precipitation. Check the local weather bureau for average snow accumulation in the area. Be sure to isolate the unit from rain gutters to avoid the foundation from possible being washed out.

Roof installation

When installing units on a roof, the structure must be capable of supporting the total weight of the unit. This also includes any framing of the unit, rails, etc., which should be used to minimize the transmission of sound or vibration into the conditioned space.

10. Refrigerant Pipe Installation

Maximum pipe length and height drop

Consider the allowable pipe length and height drop when deciding the installation position. Make sure the distance and height drop between the indoor and outdoor units do not exceed the data in the following table.

Model	Max. Length Ft. (M)	Max. Elevation Ft. (M)	Max elbow(pcs)
≤36,000Btu/h	50[15]	26[8]	5
>36,000Btu/h	66[20]	33[10]	5

The procedure of connecting pipes

1. Choose the pipe size according to **Table 4** above.
2. Confirm the cross way of the pipes.
3. Measure the necessary pipe length.
4. Cut the selected pipe with pipe cutter making the section flat and smooth. Refer to **Fig. 10-1**
5. Insulate the copper pipe.
6. Before test operation, the joint parts should not be heat insulated.
7. Drill holes if the pipes need to pass through the wall.
8. Bend the pipes if necessary to pass through the wall smoothly.
9. Bind and wrap the wires together with insulated pipe if necessary.
10. Set the wall conduit.
11. Set the support for the pipe.
12. Locate the pipe and secure to support bracket.
 - For horizontal refrigerant pipe, the distance between supports should not exceed 3.28 ft (1m).
 - For vertical refrigerant pipe, the distance between supports should not exceed 4.92 ft (1.5 m).
13. Connect the pipe to indoor unit and outdoor unit by brazing (Top discharge outdoor unit and Air Handler indoor units).
 - Top discharge outdoor unit and air handler indoor units connections are copper-to-copper and should be brazed with a phosphorous-copper alloy material, such as Silfos -5 or equivalent. **DO NOT** use soft solder. The outdoor units have reusable service valves on both the liquid and gas connections. The total system refrigerant charge is retained within the outdoor unit during shipping and installation. The reusable service valves are provided to evacuate and charge per this instruction.
 - Serious service problems can be avoided by taking adequate precautions to ensure an internally clean and dry system.

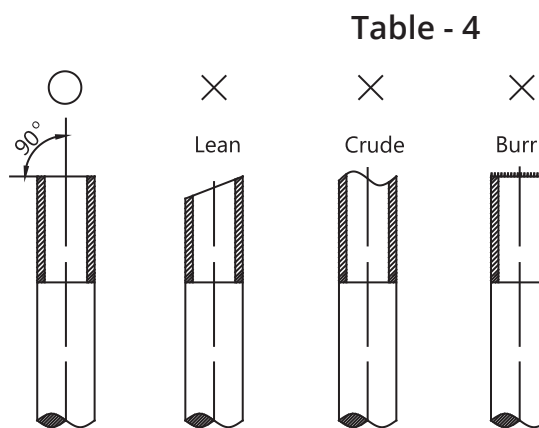


Fig.10-1

CAUTION: Dry nitrogen should always be flowing through the tubing while it is being brazed, because the temperature required is high enough to cause oxidation of the copper unless an inert atmosphere is provided. The flow of dry nitrogen should continue until the joint has cooled. Always use a pressure regulator and safety valve to ensure that only low pressure dry nitrogen is introduced into the tubing. Only a small amount of flow is necessary to displace air and prevent oxidation.

• Precautions should be taken to prevent heat damage to the service valve by wrapping a wet rag around it, as shown in the image below. Also, protect all painted surfaces and insulation during brazing. After brazing, cool the joint with a wet rag.

•The valve can be opened by removing the plunger cap, and then fully insert a hex wrench into the stem turning counter-clockwise until the valve stem just touches the chamfered retaining wall.

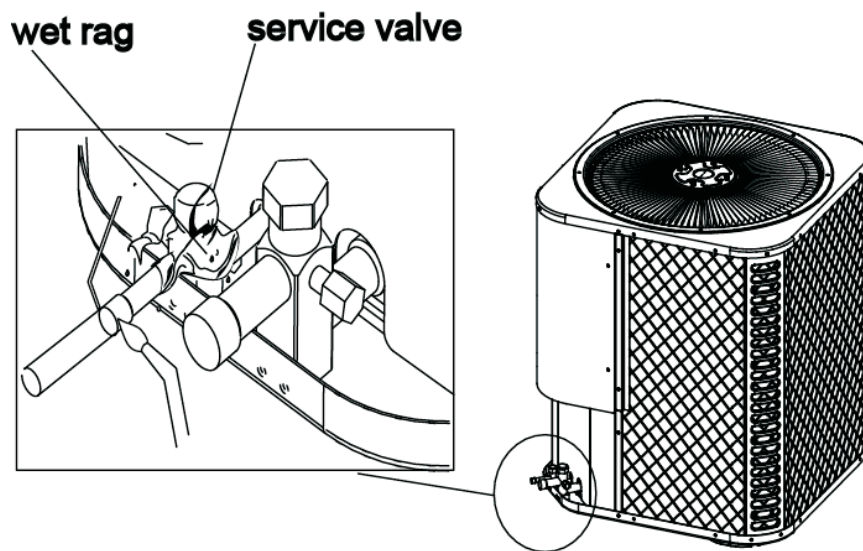


Fig. 10-2

11. Vacuum Drying and Leakage Checking

Purpose of vacuum drying

- Eliminating moisture in the system to prevent the phenomena of ice-blockage and copper oxidation. Ice-blockage can cause abnormal operation of system, while copper oxide can damage the compressor.
- Eliminating the non-condensable gas (air) in the system to prevent the components from oxidizing, pressure fluctuation, or bad heat exchange during the operation of system.

Selection of vacuum pump

- The vacuuming capability of the vacuum pump should be 756 mmHg or above.
- Precision of vacuum pump should reach 0.02 mmHg or above.

Operation procedure for vacuum drying

There are two kinds of vacuum drying that can be used depending on the environment, when the unit is installed. These are ordinary vacuum drying and special vacuum drying. These consist of the following:

Ordinary vacuum drying

1. When conducting the first vacuum drying, connect pressure gauge to the infusing mouth of the gas pipe and liquid pipe, and keep vacuum pump running for an hour (the degree of vacuum the pump should reach is, -755mmHg).
2. If the vacuum pump can not reach -755 mmHg after 1 hour of drying, it indicates that there is moisture or leakage in the pipeline system and will need to continue drying for half an hour.
3. If the vacuum pump still can not reach -755 mmHg after 1.5 hours of drying, check for leaks.
4. Leakage test: After the vacuum reaches -755 mmHg, stop vacuum drying and keep the system pressurized for 1 hour. If the indicator of the vacuum gauge increases, this is an indication that there is still moisture or a leak present.

Special vacuum drying

The special vacuum drying method should be used when:

1. Moisture is found while flushing the refrigerant pipe.
2. Installation is being conducted on a rainy day, because rain water could penetrate into the pipeline.
3. Install period is taking an extended amount of time, rain water or moisture could penetrate into the pipeline.

NOTE: Be sure to use a micron gauge during vacuuming that can hold under 800 microns. Pull down to 500 microns.

12. Additional Refrigerant Charge

After the vacuum drying process is carried out, the additional refrigerant charge process needs to be performed. The outdoor unit is factory charged with refrigerant. The additional refrigerant charge volume is decided by the diameter and length of the liquid pipe between the indoor and outdoor unit. Refer to the following formula to calculate the charge volume.

Diameter of liquid pipe (IN [mm])	1/4 [6.35]	3/8[9.52]	1/4[12.7]
Formula	$V=0.22\text{ oz} \times (L-16)$	$V=0.43\text{ oz} \times (L-16)$	$V=0.64\text{ oz} \times (L-16)$

V=Additional refrigerant charge volume (oz).

L=The length of the liquid pipe (ft).

Table - 5

- Refrigerant may only be charged after the vacuum drying process is performed.
- Always use gloves and glasses to protect your hands and eyes during the charging process.
- Use an electronic scale, or a fluid infusion apparatus, to properly weigh refrigerant to be recharged. Be sure to avoid over-charging the system with refrigerant, as it could cause a leak, damage to the compressor, or result in personal injury.
- Use supplemental flexible pipe to connect the refrigerant cylinder, pressure gauge, and outdoor unit. The refrigerant should only be charged in a liquid state.
- After the refrigerant recharging process, check for refrigerant leaks at the connection joint. (By using either a gas leakage detector or soapy water to detect).

NOTE: There are two ways to verify the correct refrigerant charge. The most commonly used method is to adjust the refrigerant charge based on the subcooling range. The second method is rarely used, but it is being included for reference only. Multiply the length of the liquid pipe and the empirical coefficient (the coefficient is determined by the pipe diameter) to verify the correct charge.

13. Pipe Insulation

Insulation of refrigerant pipe

Operational procedure of refrigerant pipe insulation

1. Cut the suitable pipe
2. Insulation (except joint section)
3. Flare the pipe
4. Piping layout and connection
5. Vacuum drying
6. Insulate the joint parts

Purpose of refrigerant pipe insulation

- During operation, the temperature of gas pipe and liquid pipe could be extremely hot or cold. Therefore, it is necessary to insulate them; otherwise it can affect the performance of the unit and damage the compressor.
- Gas pipe temperature is very low during cooling. If insulation is insufficient, condensation can form and cause leakage.
- Temperature of gas pipe is very high, generally 122°F-212°F (50°C-100°C) during heating. Insulation must be used to prevent injury.

Insulation material selection for refrigerant pipe

- Should be able to withstand temperatures of above 248°F (120°C)
- Insulation should be made of a material that meets the standards of local laws and regulations
- The thickness of insulation layer should be above 10 mm. If in a hot or wet environment, the layer of insulation should be thicker.

Installation of insulation

NOTE Gas pipe and liquid pipe should be insulated separately. If the gas pipe and liquid pipe are insulated together, it will decrease the performance of air conditioner.

- The insulation material at the joint pipe should be 5-10 cm longer than the gap of the insulation material.
- The insulation material at the pipe joint should be inserted into the gap of the insulation material.
- The insulation material at the pipe joint should be wrapped to the gas pipe and liquid pipe tightly.
- The linking part should use glue to paste together
- Be sure to not wrap the insulation material too tightly, as it may force out air in the material and cause the insulation to be less effective, and lessen its durability.

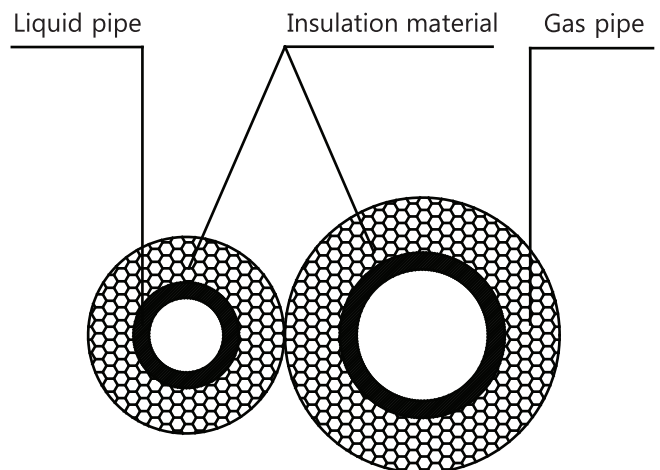


Fig. 13

Insulation of drainage pipe

Operational procedure of refrigerant pipe insulation

- Select the suitable pipe
- Insulation (except joint section)
- Piping layout and connection
- Drainage test
- Insulate the joint parts

Purpose of drainage pipe insulation

The temperature of condensate drainage water is very low. However, if insulation is insufficient, it could cause condensate to form and cause leakage which could lead to property damage.

Insulation material selection for drainage pipe

- The insulation material should be flame retardant and in accordance to the guidelines of local law.
- Thickness of insulation layer is usually above 10 mm.
- Use specific glue to paste the seam of insulation material, and then bind with adhesive tape. The width of tape should not be less than 5 cm. Make sure it is firm and avoid condensation.

Installation of insulation

The single pipe should be insulated before connecting to another pipe, the joint should be insulated after the drainage test.

There should be no insulation gap between the insulation material.

14. Electrical Wiring Installation & Requirements

Highlights of electrical wiring installation

- All field wiring construction should be performed by a qualified electrician.
- Air conditioning equipment should be grounded according to the local electrical regulations.
- Current leakage protection switch should be installed.
- Do not connect the power wire to the terminal of signal wire.
- When power wire is parallel with signal wire, put each wire in their own wire tube and make sure there is at least a 12 in (300 mm) gap between them.
- Using the following tables to select the proper wire guage.
- Select different colors for different wire according to relevant regulations.
- Do not use metal wire tube where it could be exposed to acid or alkali corrosion. Use plastic wire tube to replace it.
- There must not be wire connect joints in the wire tube. If a joint is a must, set a connection box at the place.
- Wiring of varying voltage should not be in one wire tube.
- Ensure that the color of the wires of the outdoor unit and the terminal No. are same as those of indoor unit respectively.

Electric Wiring Guage

Model (cooling only type)			18K	24K	30K	36K	42K	48K	60K
Line Gauge	Indoor Unit Power Line	Line Quantity	3	3	3	3	3	3	3
		Line Diameter(AWG)	16	16	16	16	16	16	16
	Outdoor Unit Power Line	Line Quantity	3	3	3	3	3	3	3
		Line Diameter(AWG)	14	14	12	12	10	10	10
	Outdoor-Indoor Singal Line	Line Quantity	2	2	2	2	2	2	2
		Line Diameter(AWG)	18	18	18	18	18	18	18
	Thermostat Singal Line	Line Quantity	4	4	4	4	4	4	4
		Line Diameter(AWG)	18	18	18	18	18	18	18

Table - 6

Model (cooling & heating type)			18K	24K	30K	36K	42K	48K	60K
Line Gauge	Indoor Unit Power Line	Line Quantity	3	3	3	3	3	3	3
		Line Diameter(AWG)	16	16	16	16	16	16	16
	Outdoor Unit Power Line	Line Quantity	3	3	3	3	3	3	3
		Line Diameter(AWG)	14	14	12	12	10	10	10
	Outdoor-Indoor Singal Line	Line Quantity	2	2	2	2	2	2	2
		Line Diameter(AWG)	18	18	18	18	18	18	18
	Thermostat Singal Line	Line Quantity	6	6	6	6	6	6	6
		Line Diameter(AWG)	18	18	18	18	18	18	18

Table - 7

15. Test Operation

The test operation must be carried out after the entire installation has been completed.

Check off the following before testing the operation:

- Are both the indoor unit and outdoor unit installations completed?
- Is tubing and wiring completed?
- Have you checked the refrigerant pipe system for leaks?
- Is drainage unimpeded?
- Is the ground wiring connected correctly?
- Has the length of the tubing and added stow capacity of the refrigerant been recorded?
- Does the power voltage fit the rated voltage of the air conditioner?
- Are there any obstacles blocking the outlet or inlet of the outdoor and indoor units?
- Are both the gas-side and liquid-side valves fully opened?

Note - the air conditioner is pre-heated by turning on the power.

To test the operation, set the air conditioner under the mode of "COOLING" by remote controller, and check the following points.

Indoor Unit:

- Does the switch on the controller work well?
- Do the buttons on the remote controller work well?
- Do the air flow louvers move normally?
- Has the room temperature adjusted well?
- Do the indicator lights work normally?
- Do the temporary buttons work well?
- Is the drainage normal?
- Is there vibration or abnormal noise during operation?

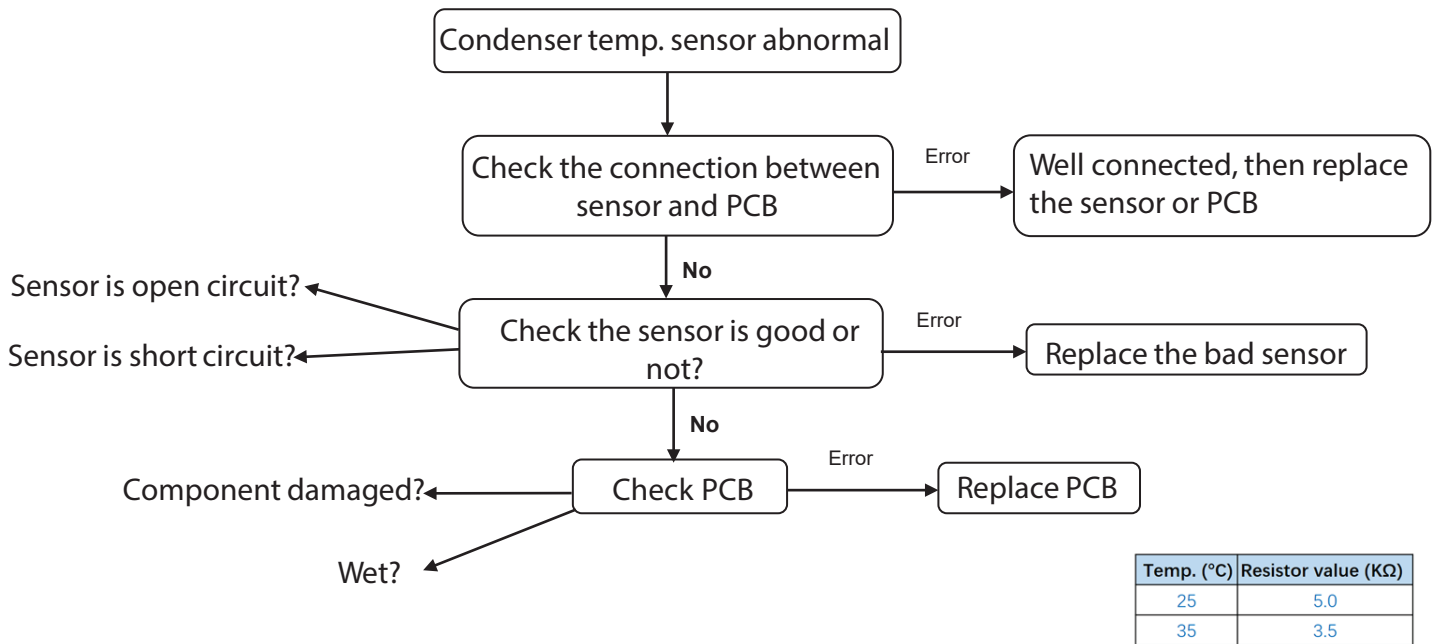
Outdoor Unit:

- Is there any vibration or abnormal noise during operation?
- Does the generated wind, noise, or condensation created by the air conditioner have any negative influence on the surrounding area?
- Has any of the refrigerant leaked?

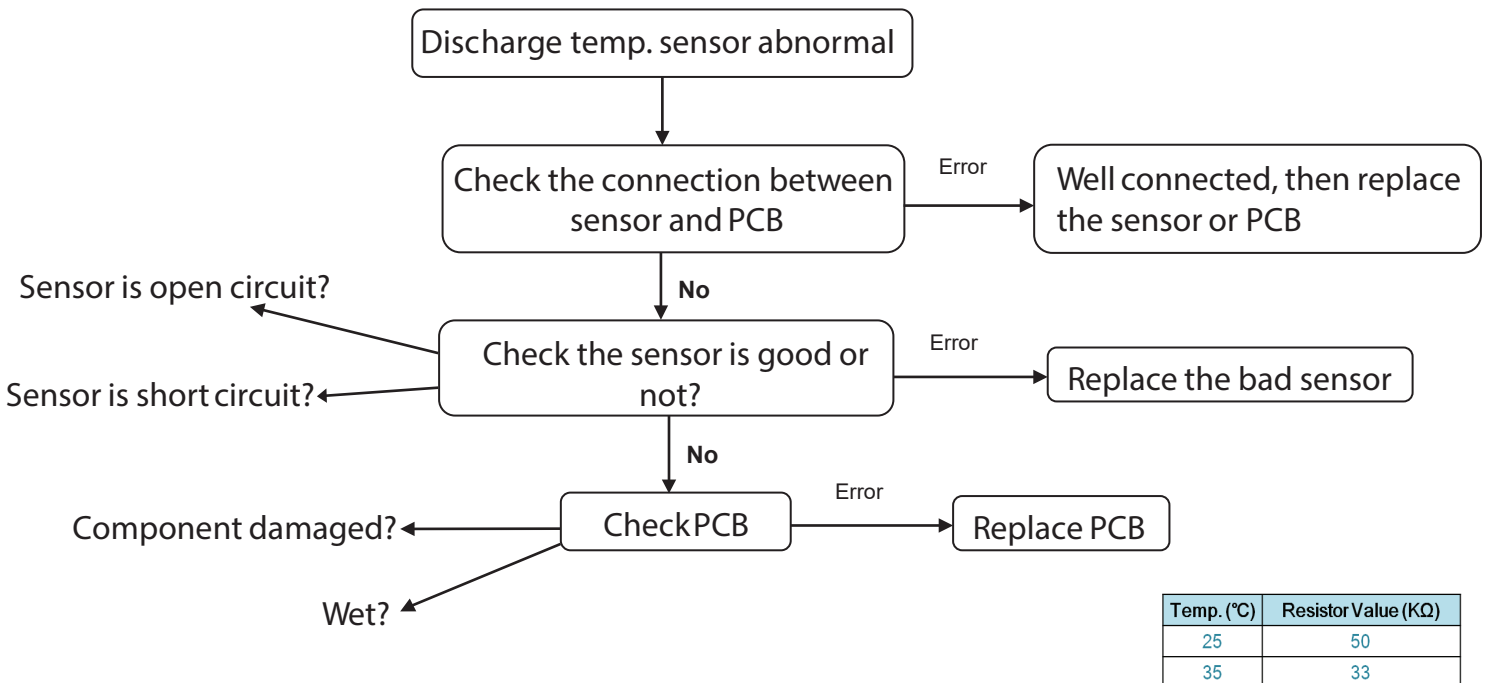
16. Troubleshooting

Display content		State description
No alarm: green light flashes Yellow lights	Green light slow flash	Normal standby
	Green light normally on	Normal operation
System Alarm: Green light or Yellow light slowly flashes	(T3)Temperature sensor fault	Yellow light flashes 2 times every 8 seconds
	(T5)Temperature sensor fault	Yellow light flashes 8 times every 8 seconds
	Low air pressure alarm	Yellow light flashes 6 times every 8 seconds
	High pressure alarm	Yellow light flashes 1 times every 8 seconds
	(T3)High temperature protection	Yellow light flashes 9 times every 8 seconds
	High exhaust temperature protection	Yellow light flashes 5 times every 8 seconds
System lock: Green light goes out and Yellow light is on	3 high/low voltage protection in 20 minutes	Turn off power for 10-15 minutes and then restart.
	Exhaust temperature is too high for 3 times within 20 minutes	
	T3 high temperature protection 3 times within 20 minutes	

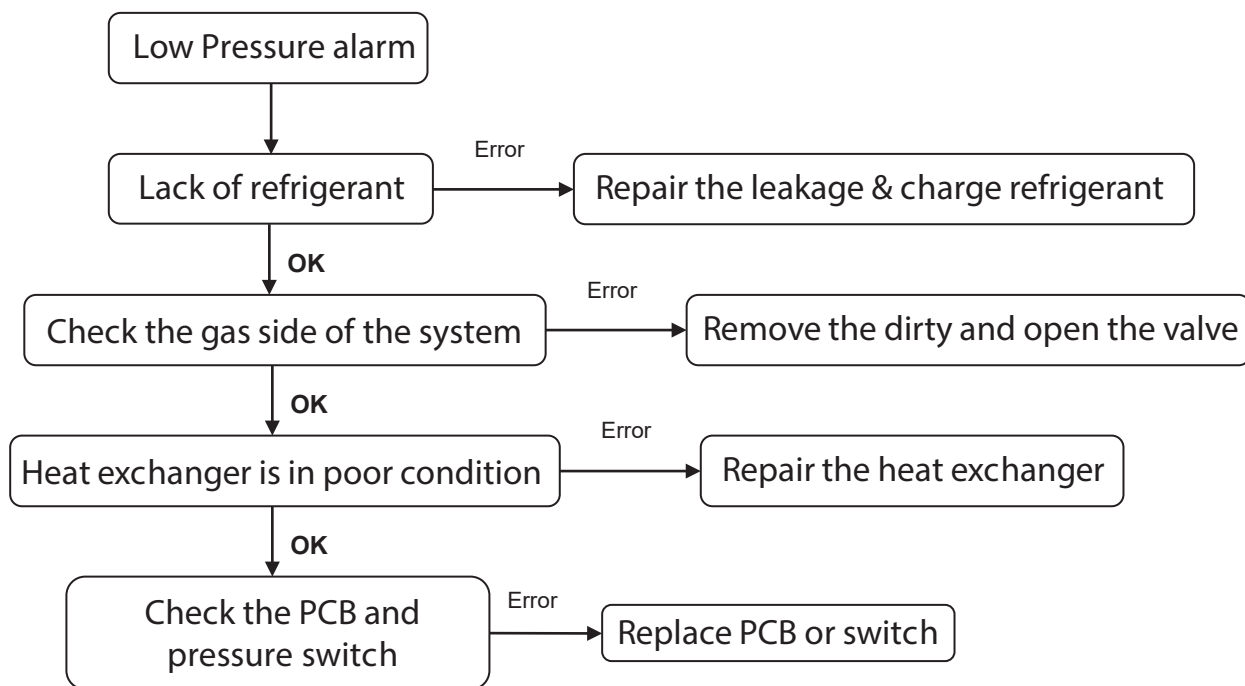
T3 Condenser Temperature sensor fault



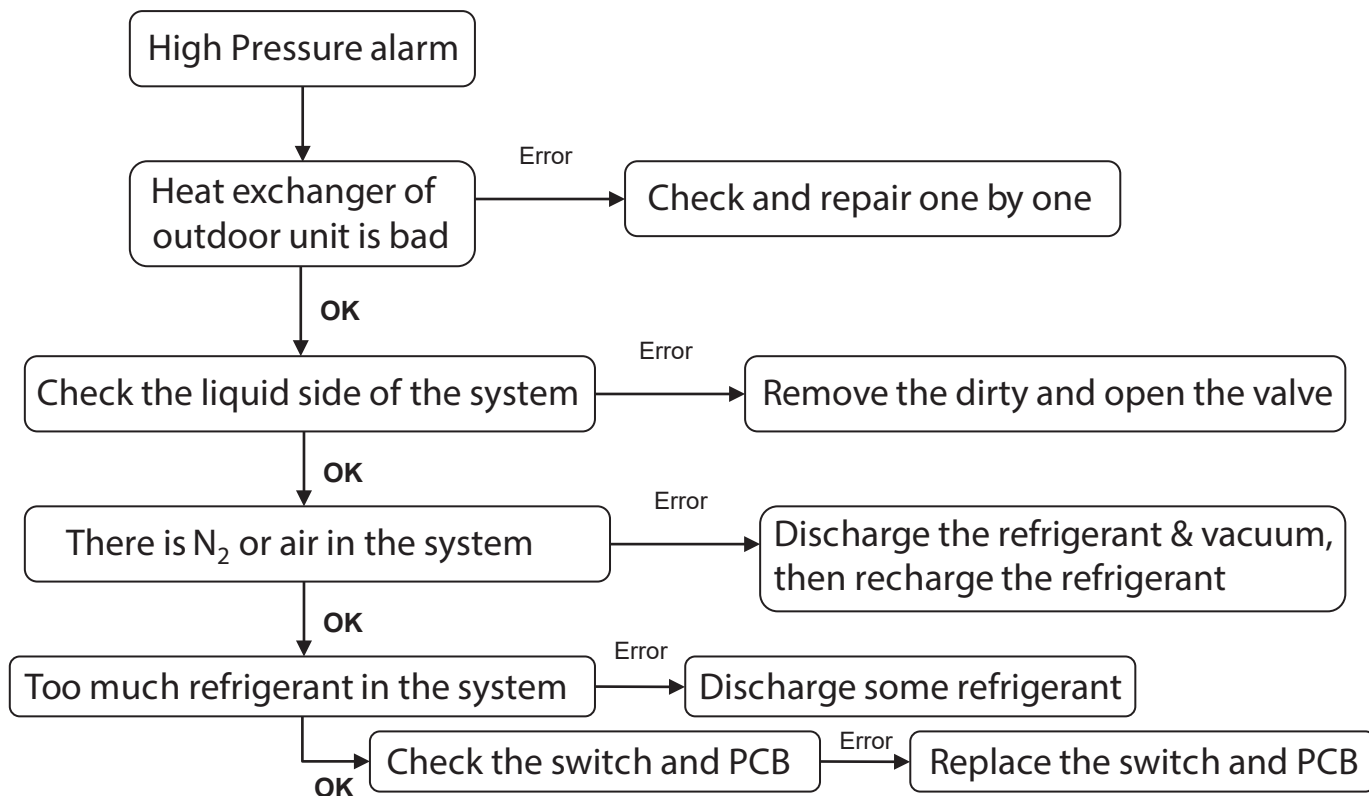
T5 discharge Temperature sensor fault



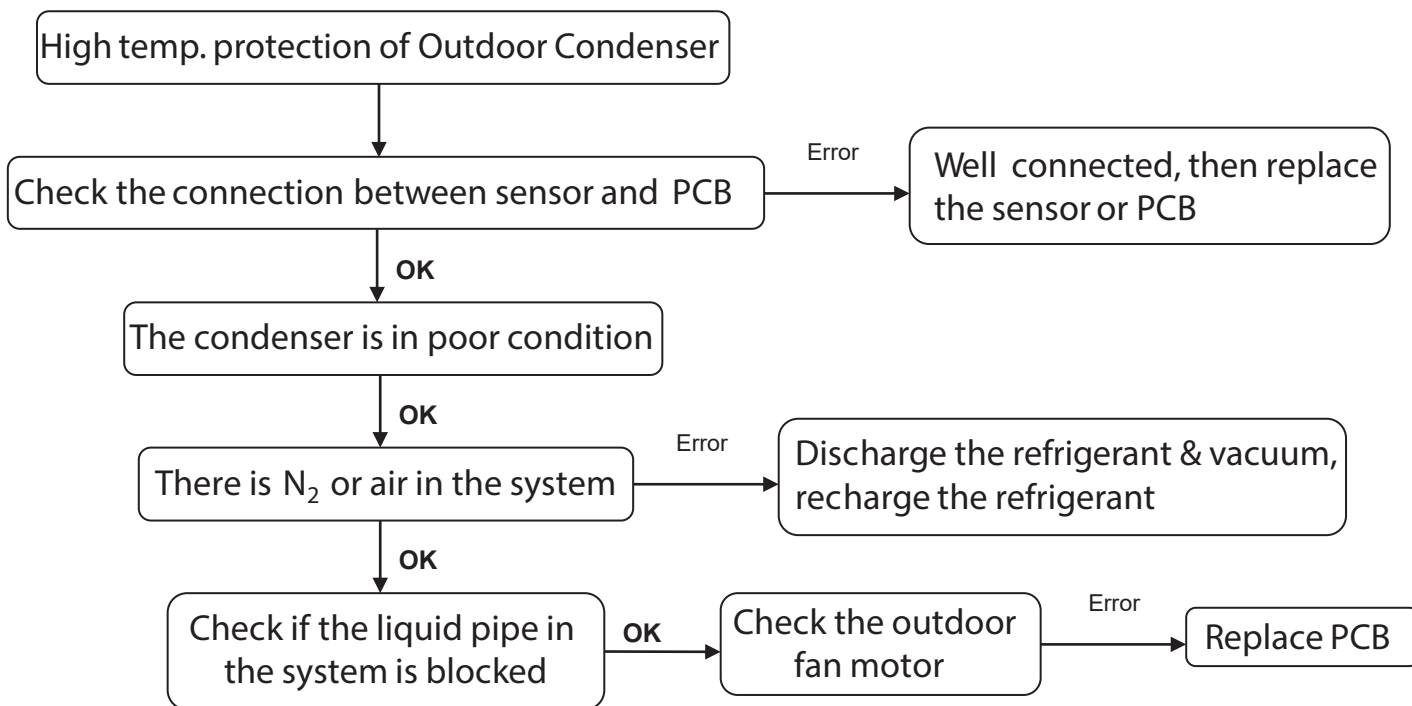
Low pressure alarm



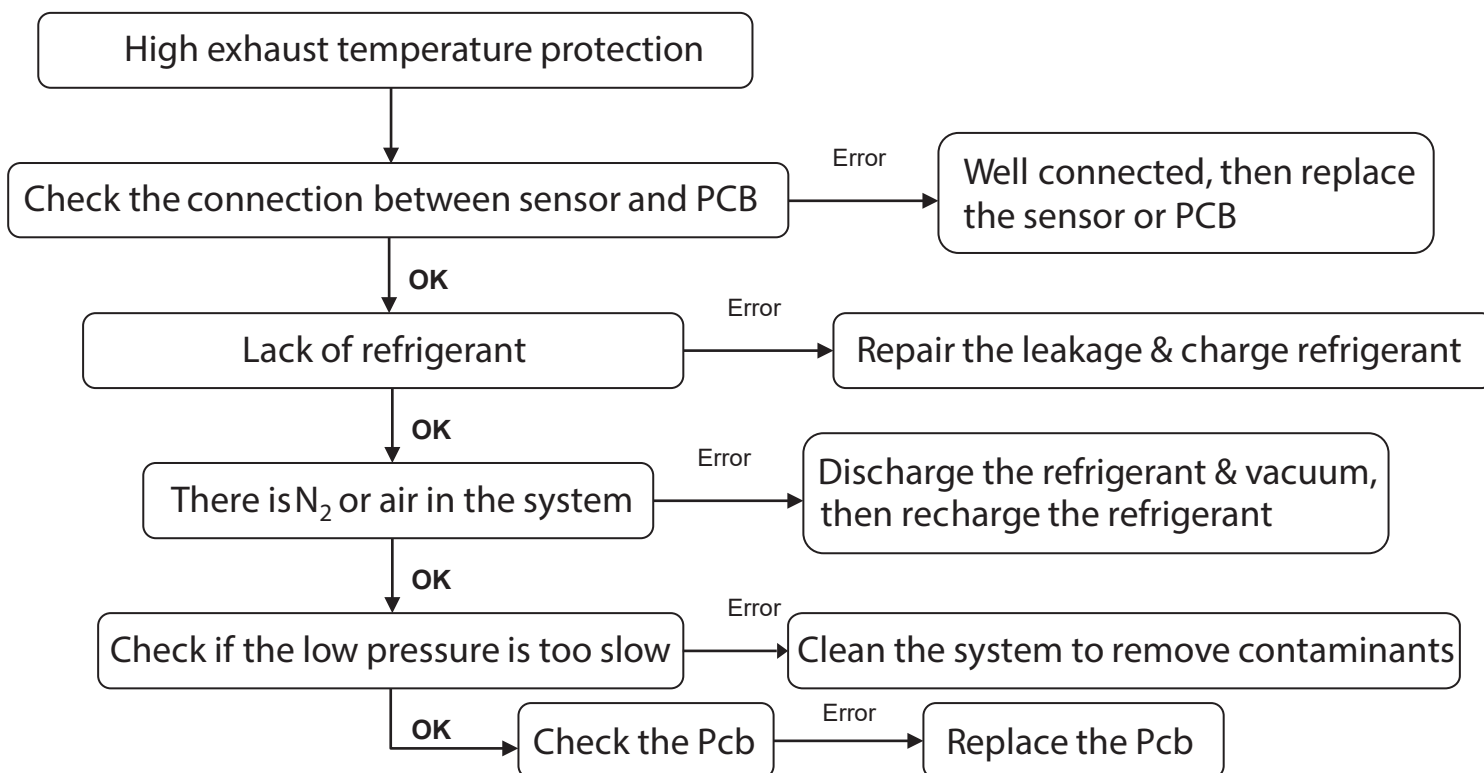
High pressure alarm



(T3)High temperature protection



High exhaust temperature protection





MRCOOL®

COMFORT MADE SIMPLE

PRODIRECT™ Series

Split System Heat Pump & Air Conditioner

13 -14 SEER 1.5-5 Tons Model

HHP140* & HAC140*

The design and specifications of this product and/or manual are subject to change without prior notice. Consult with the sales agency or manufacturer for details.



Limited Warranty



Models:

HAC14018, HAC14024, HAC14030, HAC14036, HAC14042, HAC14048, HAC14060, HHP14018, HHP14024, HHP14030, HHP14036, HHP14042, HHP14048, HAH14018, HAH14024, HAH14030, HAH14036, HAH14042, HAH14048, HAH14060

This non-transferable warranty provides for a total of 10 years of limited warranty coverage (Standard 5-year plus an additional 5-year extended parts and compressor warranty). Unless otherwise noted in the terms outlined in the following warranty, you must register your product at one of the following links to receive the additional 5 years of MRCOOL product warranty:

English: <https://mrcool.com/your-warranty/mrcool-minisplit-warranty-registration.html>

Espanol: <https://mrcool.com/your-warranty/spanish/mrcool-minisplit-warranty-registration.html>

This warranty applies only to units installed in owner-occupied residences. Units installed in buildings other than owner-occupied residences are separately warranted in either MRCOOL's Multi-Family Residence Warranty (if installed in a multi-family residence not occupied by the owner) or MRCOOL's Commercial Warranty (if installed in a non-residential building). For a copy of either the Multi-Family Residence Warranty or the Commercial Warranty, visit www.mrcool.com.

The unit models listed above, if installed in owner-occupied residences, are warranted by "MRCOOL" against defects in materials and workmanship under normal use and maintenance, as provided below:

To the original registered owner, MRCOOL provides a non-transferable warranty period of five (5) years on the compressor and five (5) years on all parts to the original end user. **An additional five (5) years limited warranty coverage on all parts and compressor is provided to the original end user when the product is registered online within 60 days of installation given the following conditions and limitations:**

This warranty does not continue after the unit is removed from the location where it was originally installed.

This warranty DOES NOT apply to, and no warranty is offered by MRCOOL on any unit that IS NOT purchased from an authorized dealer and installed with adherence to all applicable federal, state, and local codes, policies and licensing requirements.

The 5 year warranty period does not apply to any unit that is installed with a used and/or unapproved condenser / air handler. In such a case, this warranty in its entirety defaults to a period of **1 YEAR**.

The warranty period begins on the date of the original installation. If that date cannot be verified, the warranty period begins three months after the month of purchase.

As its only responsibility, and your only remedy, MRCOOL will furnish a replacement part, without charge for the part only, to replace any part that is found to be defective due to workmanship or materials under normal use and maintenance. For warranty credit, the defective part must be returned to a MRCOOL heating and air conditioning products distributor by a state or province certified or licensed contractor. Any part replaced pursuant to this warranty is warranted only for the unexpired portion of the warranty term applying to the original part.

This warranty does not apply to labor, freight, or any other cost associated with the service, repair or operation of the unit. MRCOOL will not pay for electricity or fuel costs, or increases in electricity or fuel costs, for any reason, including additional or unusual use of supplemental electric heat. This warranty does not cover lodging or labor charges. This warranty does not cover refrigerant.

MRCOOL is not responsible for:

1. Damage or repairs required as a consequence of faulty installation or application.
2. Damage as a result of floods, fires, winds, lightning, accidents, corrosive atmosphere or other conditions beyond the control of MRCOOL.
3. Damage or repairs required as a result of the use of components or accessories not compatible with this unit.
4. Units installed outside the United States or its territories, or Canada.
5. Normal maintenance as described in the installation and operating manual, such as cleaning of the coils, filter cleaning and/or replacement, and lubrication.
6. Parts or accessories not supplied or designated by MRCOOL.
7. Damage or repairs required as a result of any improper use, maintenance, operation or servicing.
8. Damage or failure to start due to interruption and/or inadequate electrical service.
9. Any damage caused by frozen or broken water pipes in the event of equipment failure.
10. Changes in the appearance of the unit that do not affect its performance.
11. Replacement of fuses and replacement or resetting of circuit breakers.
12. Units operated in incomplete structures.
13. Damage or repairs required as a result of the use of used or recycled refrigerant.

This warranty is provided in lieu of any and all other warranties, expressed or implied, including any implied warranty of merchantability and fitness for a particular purpose. Whether any claim is based on negligence or other tort, breach of warranty or other breach of contract, or any other theory, IN NO EVENT SHALL MRCOOL, LLC BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES TO ANY PERSONAL, INTANGIBLE, AND/OR REAL PROPERTY; NOR SHALL MRCOOL, LLC BE LIABLE FOR EXPENSES RESULTING FROM BUSINESS INTERRUPTION, INCLUDING BUT NOT LIMITED TO LOST PROFITS, EXTRA UTILITY COSTS OR OTHERWISE. Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

For further information about this warranty visit mrcool.com