



# MINI-SPLIT SYSTEMS SERVICE MANUAL

## Indoor and Outdoor Unit Information

100090  
03/2024  
Supersedes 12/2023



**Mini-Split Multi-Position Indoor Air Handler (MMA)**



**MLB & MPC Outdoor Units**

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## **⚠ WARNING**

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a qualified installer or service agency.

## **⚠ WARNING**



Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

## **⚠ WARNING**

To prevent serious injury or death:

- 1- Lock-out/tag-out before performing maintenance.
- 2- If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the "OFF" position before performing maintenance.
- 3- Always keep hands, hair, clothing, jewelry, tools, etc., away from moving parts.

## **⚠ CAUTION**

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

### **1. Safety Precautions**

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure the risk of ignition is minimized.

- Work in a controlled environment to minimize the risk of a flammable gas or vapor being present.
- All maintenance staff and others working in the local area must be informed on the nature of work being completed
- Avoid working in confined spaces.
- Section off the area around the work space.
- Ensure the conditions within the area have no flammable materials.

#### **1.1. Refrigerant Presence**

- Use a refrigerant detector to verify the work area does not have flammable substances
- Ensure the leak detection equipment is suitable for use with flammable refrigerants (i.e. no sparking, adequately sealed or intrinsically safe)

#### **1.2. Fire Extinguisher**

If any hot work is required on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment must be immediately available (such as a dry powder or CO2 fire extinguisher adjacent to the charging area).

#### **1.3. No Ignition Sources**

## **⚠ WARNING**

Do not use any sources of ignition while servicing the refrigeration system. Pipe work that contains or has contained flammable refrigerant could lead to risk of fire or explosion if exposed to sources of ignition.

- Prior to servicing the unit, survey the area around the equipment to ensure there are no flammable hazards or ignition risks.
- Keep all possible ignition sources (including cigarette smoking) away from the site during installation, repair, or removal and disposal of refrigerant.

## 1.4. Ventilated Workspace

Ensure the work area is adequately ventilated before breaking into the system or conducting any hot work. Maintain ventilation until service is complete. The ventilation should safely disperse any released refrigerant and expel it externally into the atmosphere.

## 1.5. Check Refrigeration Equipment

If changing electrical components, verify the components are a correct fit and appropriately serves the purpose. Verify the following points when executing installations that require flammable refrigerants.

- The charge size is in accordance with the room size within which the refrigerant containing parts are installed
- The ventilation machinery and outlets are operating adequately and are not obstructed
- If an indirect refrigerating circuit is being used, the secondary circuit must be checked for the presence of refrigerant marking to the equipment continues to be visible and legible.
- Correct any illegible markings and signs
- Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance that may corrode refrigerant containing components, unless the components are constructed of materials that are inherently resistant to corrosion

## 1.6. Check Electrical Devices

Repair and maintenance to electrical components must include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, do not connect any electrical supply to the circuit until the issue is resolved. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution can be used. Report the temporary solution to the owner of the equipment so all parties are advised. Initial safety checks include:

- Capacitors are discharged; use caution to avoid the possibility of sparking
- No live electrical components and wiring are exposed while charging, recovering, or purging the system
- Continuity of earth bonding

## 1.7. Repair Seal Components

During repairs to sealed components, all electrical supplies must be disconnected from the equipment being serviced prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection must be located at the most critical point to warn of a potentially hazardous situation.

Pay close attention to the following to ensure safety when servicing electrical components:

- Casing is not altered in such a way that negatively affects the level of protection (damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.)
- Ensure the apparatus is mounted securely
- Ensure that seals or sealing materials have not degraded or no longer can prevent the ingress of flammable atmospheres. Replacement parts must be in accordance with the manufacturer's specifications.

**NOTE:** *The use of silicon sealant may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to servicing them.*

## 1.8. Repair to Intrinsically Safe Components

When repairing intrinsically safe components:

- Do not apply any permanent inductive or capacitance loads to the circuit without ensuring it will not exceed the permissible voltage and current permitted for the equipment in use.
- Intrinsically safe components are the only types of components that can be serviced while live in the presence of a flammable atmosphere.
- The test apparatus must be at the correct rating.
- Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

## 1.9. Check Cabling

When conducting the safety check, consider the effects of aging or continual vibration from sources such as compressors or fans. Verify cabling is not positioned in an environment that will make it vulnerable to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects.

## 1.10. Flammable Refrigerant Detection

### CAUTION

**Do not use potential sources of ignition when detecting refrigerant leaks. Do not use a halide torch or any other detector that employs a naked flame**

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants.

- Use electronic leak detectors to detect flammable refrigerants

**NOTE:** *The sensitivity of electronic leak detectors may not be adequate or may need re-calibration. Detection equipment must be calibrated in a refrigerant-free area. Ensure the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment must be set at a percentage of the LFL of the refrigerant and must be calibrated to the refrigerant in use and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are suitable for use with most refrigerants, but the use of detergents containing chlorine must be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.*

- Remove or extinguish all naked flames if a leak is suspected
- If a leakage of refrigerant is found and requires brazing, all refrigerant must be recovered from the system or isolated (by means of shut off valves) in a part of the system that is remote from the leak. Oxygen-free nitrogen (OFN) must then be purged through the system both before and during the brazing process.

## 1.11. Remove/Evacuation of Refrigerant

Use conventional procedures when breaking into the refrigerant circuit to make repairs or for any servicing purpose. It is important to follow best practices since flammability is a possibility. The following are high level instructions for removing and evacuating refrigerant.

1. Remove refrigerant
2. Purge the circuit with inert gas
3. Evacuate
4. Purge again with inert gas
5. Open the circuit by cutting or brazing

## Refrigerant Removal or Evacuation Tips

- The refrigerant charge must be recovered into the correct recovery cylinders.
- The system must be flushed with OFN to render the unit safe. This process may need to be repeated several times.
- Do not use compressed air or oxygen for this task.
- Flushing is achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is met, then vented to the atmosphere, and pulling down to a vacuum. This process must be repeated until no refrigerant is within the system.
- The system must be vented down to atmospheric pressure in order to service the unit after the final OFN charge is used. This operation is absolutely vital if brazing operations on the pipe-work is planned.
- Verify the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

## 1.12. Charging Procedures

In addition to conventional charging procedures, the following requirements must be met:

- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines must be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders must be kept upright.
- Ensure that the refrigeration system is grounded prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system it must be pressure tested with OFN. The system must be leak tested on completion of charging, but prior to commissioning. A follow-up leak test must be executed prior to leaving the site.

### 1.13. Decommissioning

Before executing this procedure, it is essential that the technician is completely familiar with the equipment and all its components. Take an oil and refrigerant sample before beginning task and isolate the system electrically..

In case analysis is required prior to re-use of reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

Prior to decommissioning:

- Verify mechanical handling equipment is available, if required, for handling refrigerant cylinders
- Verify all personal protective equipment is available and being used correctly
- Verify the recovery process is supervised at all times by competent person
- Verify the recovery equipment and cylinders conform to the appropriate standards
- Pump down refrigerant system, if possible. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- Verify the cylinder is situated on the scales before recovery takes place.
- Start the recovery machine and operate in accordance with manufacturer's instructions.
- Do not overfill cylinders. (No more than 80 % volume liquid charge).
- Do not exceed the maximum working pressure of the cylinder, even temporarily.

**NOTE:** *When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.*

- Do not charge another refrigeration system with the recovered refrigerant unless it has been cleaned and checked.

### 1.14. Labeling

To ensure decommissioned equipment is appropriately identified:

- Equipment must be labeled as "Decommissioned and emptied of refrigerant."
- The label must be dated and signed.
- Verify equipment has labeling that states the equipment once contained flammable refrigerant.

### 1.15. Recovery

When removing refrigerant from a system (either for servicing or decommissioning), use best practices and caution to ensure refrigerant is removed safely.

#### When transferring refrigerant into cylinders:

- Only use appropriate refrigerant recovery cylinders
- Ensure that the correct numbers of cylinders for holding the total system charge are available
- All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant)
- Cylinders must be complete with pressure relief valve and associated shut-off valves in good working order
- Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

#### Recovery Equipment

The recovery equipment must be in good working order (with a equipment instructions nearby) and suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales must be available and in good working order.

#### Hoses

Hoses must have leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained, and any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

#### Handling Recovered Refrigerant

The recovered refrigerant must be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

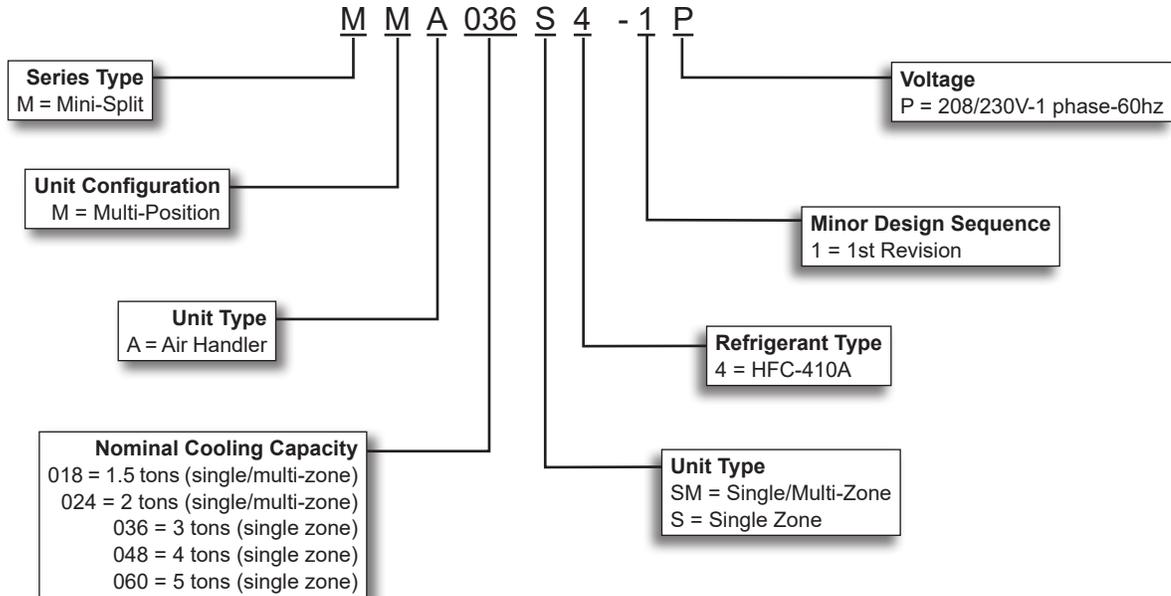
#### Compressor Oils

If compressor oils are removed, ensure the oils have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process must be executed prior to returning the compressor to the suppliers. Only electric heating to the compressor body should be used to accelerate this process. When oil is drained from a system, it must be carried out safely.

# Indoor Unit Information

## 2. MMA (Mini-Split Multi-Position Air Handler)

### 2.1. Model Number Identification



### 2.2. Indoor Unit Specifications

SINGLE ZONE & MULTI-ZONE		1.5 - 5 TON				
Model No.	MMA018SM4	MMA024SM4	MMA036S4	MMA048S4	MMA060S4	
Nominal Tons	1.5	2	3	4	5	
Power Supply - 60 Hz - 1 phase	208/230V	208/230V	208/230V	208/230V	208/230V	
<sup>1</sup> Maximum overcurrent protection (MOCP) (unit only)	15	15	15	15	15	
<sup>2</sup> Minimum circuit ampacity (MCA) (unit only)	3	4	5	7.5	9	
Room Temperature Range	Cooling	60°F - 90°F (15°C - 32°C)				
	Heating	0°F - 30°F (-17°C to -1°C)				
Air Volume - cfm (High/Medium/Low)	576/529/489	759/694/629	1082/971/865	1282/1094/906	1582/1359/1135	
External Static Pressure (in. w.g)	0 - 0.8	0 - 0.8	0 - 0.8	0 - 0.8	0 - 0.8	
Sound Data (dBA) - Low/Medium/High	39/37/35	41/39/38	46/42/39.5	53.5/47/43.5	50/47/45	
Piping Connections - Liquid/Gas line (o.d.) - in. flare	1/4 / 1/2	3/8 / 5/8	3/8 / 5/8	3/8 / 5/8	3/8 / 7/8	
Drain connection o.d. - in. fpt	3/4	3/4	3/4	3/4	3/4	
<sup>3</sup> Filters	Size of filter - in.	16 x 20 x 1	16 x 20 x 1	19-1/2 x 20 x 1	23 x 20 x 1	
Shipping weights - lbs.	128	128	153	156	190	
Optional Electric Heat	Electric Heat - See Electric Heat Data Tables on page 8.					
Electric Heat	Net weights - lbs.	11	13	13	15	16

## ELECTRIC HEAT DATA

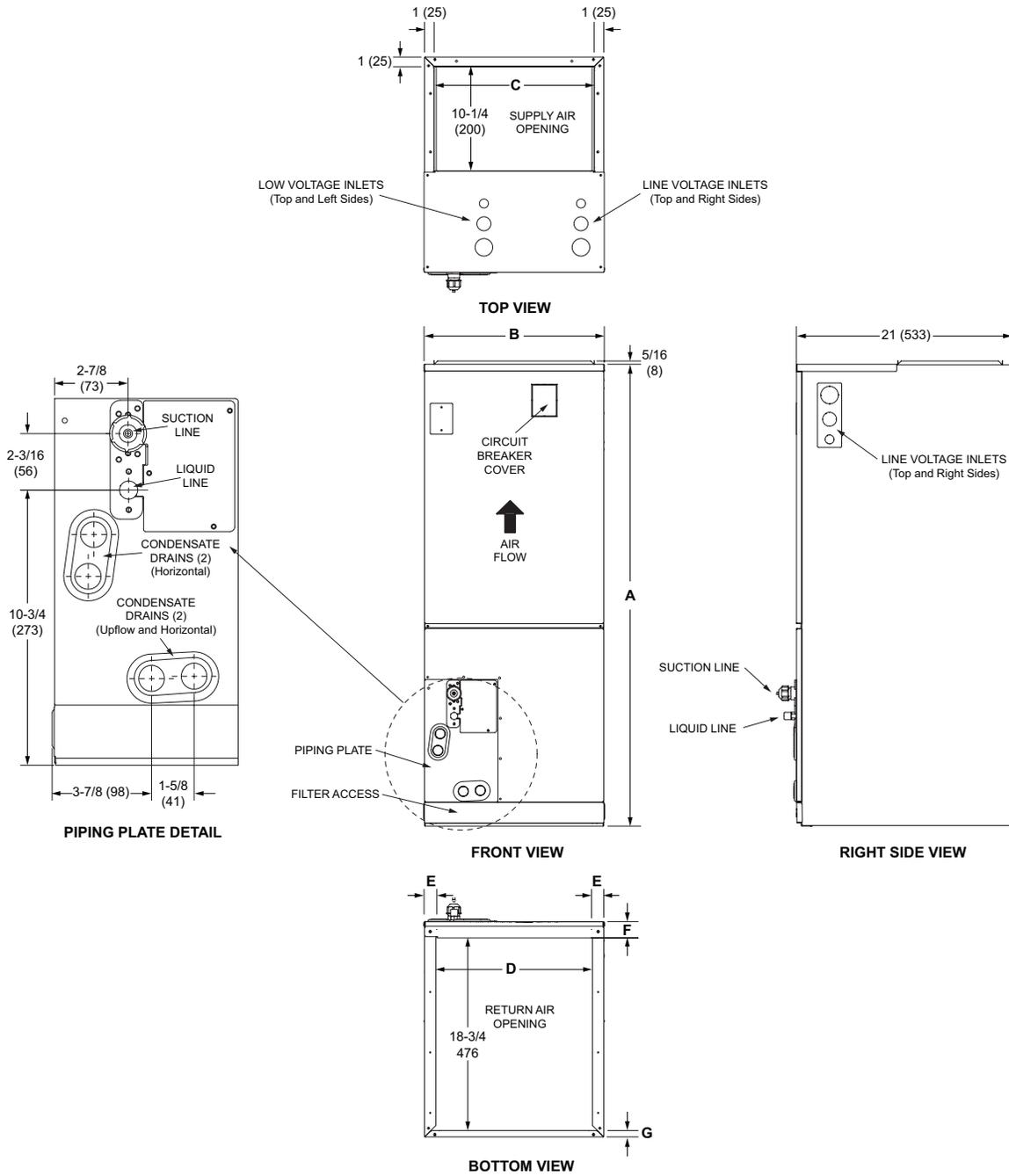
Indoor Model Usage	Electric Heat Size and Model Number	Input			<sup>2</sup> Minimum Circuit Ampacity (MCA)		<sup>3</sup> Maximum Overcurrent Protection (MOCP)	
		Volt	kW	<sup>1</sup> Btuh	Ckt 1	Ckt 2	Ckt 1	Ckt 2
018, 024, 036	5 kW 24Z26	208	3.8	12,800	23 / 27	---	25 / 30	---
		220	4.2	14,300				
		230	4.6	15,700				
		240	5.0	17,100				
018, 024, 036, 048	8 kW 24Z27	208	6.0	20,500	37 / 42	---	40 / 45	---
		220	6.7	22,900				
		230	7.3	25,100				
		240	8.0	27,300				
018, 024, 036, 048, 060	10 kW 24Z28	208	7.5	25,600	46 / 53	---	50 / 60	---
		220	8.4	38,700				
		230	9.2	31,400				
		240	10.0	34,100				
024, 036, 048, 060	15 kW 24Z29	208	11.3	38,400	23 / 27	46 / 53	25 / 30	50 / 60
		220	12.6	43,000				
		230	13.5	47,000				
		240	15.0	51,200				
036, 048, 060	20 kW 24Z30	208	15.0	51,200	46 / 53	46 / 53	50 / 60	50 / 60
		220	16.8	57,300				
		230	18.4	62,700				
		240	20.0	68,200				

<sup>1</sup> Electric heater capacity only - does not include additional blower motor heat capacity.

<sup>2</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements. Use wires suitable for at least 167°F.

<sup>3</sup> HACR type breaker or fuse.

## 2.4. MMA Indoor Unit Dimensions



**Figure 1. Mini-Split Dimensions**

**NOTE:** Unit is shipped configured for horizontal left-hand air discharge. Unit may be converted to horizontal right-hand air discharge by repositioning horizontal drain pan. Dimensions remain the same in all configurations.

Model No.	018 / 024		036 / 048		060	
	in.	mm	in.	mm	in.	mm
A	45	1143	49	1245	53	1346
B	17-1/2	445	21-1/4	540	24-1/2	622
C	15-5/8	397	19-1/8	486	22-5/8	575
D	15-1/8	384	18-5/8	473	22-1/8	562
E	1-1/4	32	1-1/4	32	1-1/8	28
F	1-1/2	38	1-5/8	41	1-5/8	41
G	5/8	16	5/8	16	3/4	19

## 2.5. MMA Indoor Unit Clearances

### Non-Ducted Return Closet Installation

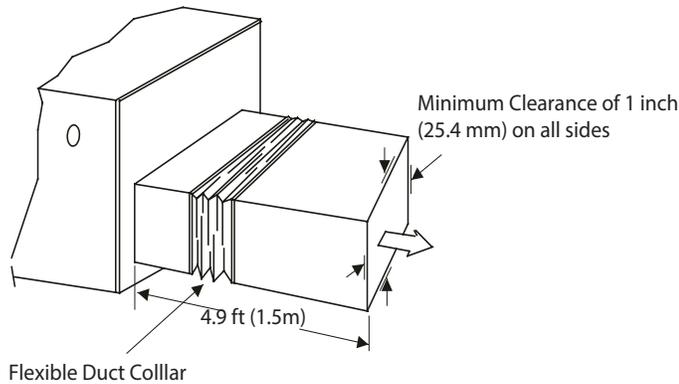
The air handler can be installed in a closet with a false bottom to form a return air plenum. It may also be installed with a return air plenum under the air handler. Louvers or return air grilles are field-supplied. Local codes may limit application of systems without a ducted return to single-story buildings.

### Minimum Open Area for Louvers

When an air handler unit is installed in a closet with a louvered return opening, use the following table to determine the minimum open area for the louvers:

Model	Minimum Open Area
018, 024	320 square inches
036	360 square inches
048 - 060	450 square inches

If the free area is not known, assume a 25% free area for wood or a 75% free area for metal louvers or grilles. Using the louver dimensions and the 25% or 75% assumption, determine if the open area meets the minimum open area listed above.



**Figure 2. Plenum Clearance (Horizontal Installation)**

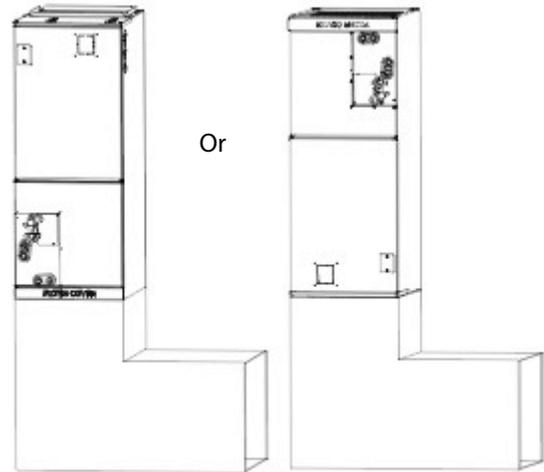
If a return air plenum is used, the return air grille should be immediately in front of the opening in the plenum to allow for the free flow of return air. When not installed in front of the opening, there must be adequate clearance around the air handler to allow for the free flow of return air.

### Plenum Clearance

The outlet side pipe length is 4.9 ft (1.5m) There should be a clearance of 1 in. (25.4mm) on all sides of the plenum.

### Vertical Installation (Ducted)

When installed vertically (upward or downward), the lower end of the air outlet must be connected to the L-shaped metal air duct and fastened by screws.



**Figure 3. Air Handler (Shown in Vertical Installation with L-Shape Duct)**

2.6. Indoor Unit Blower Data

2.6.1. MMA018

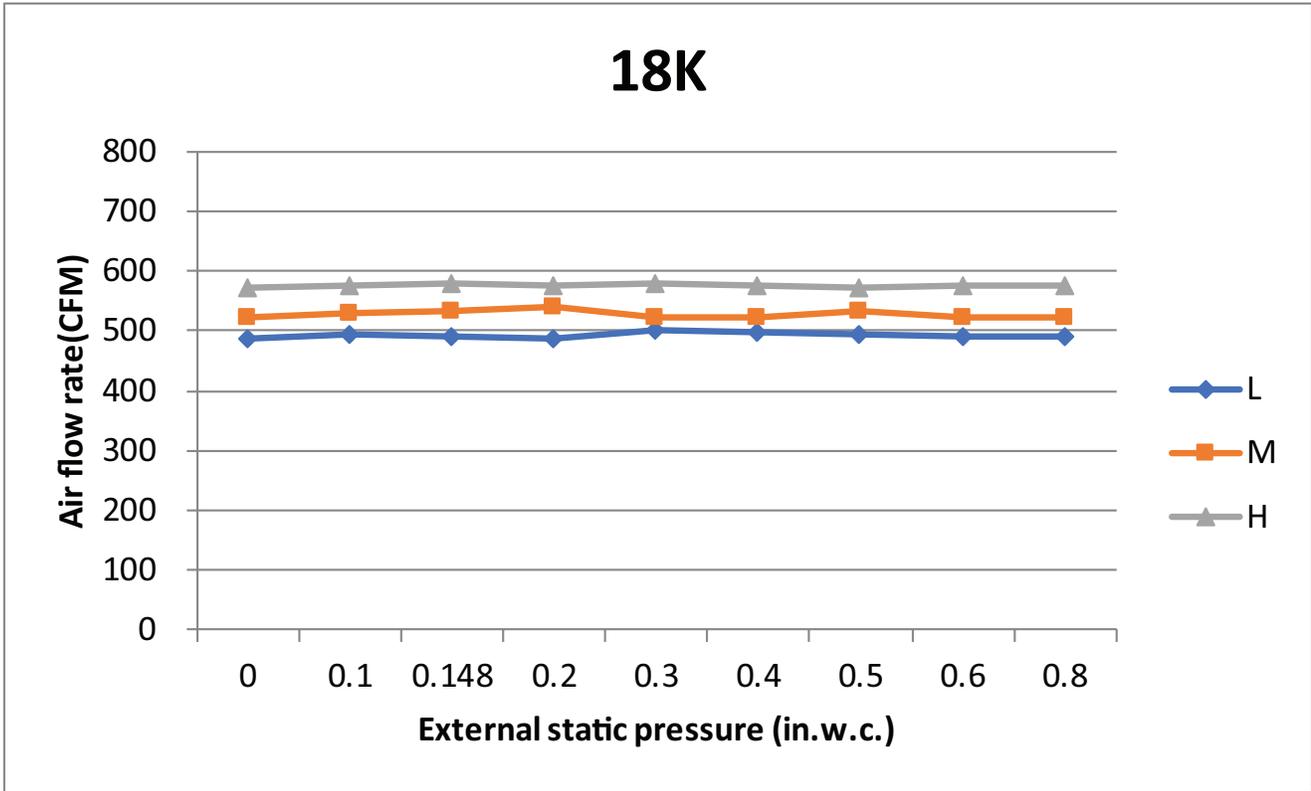


Figure 4. MMA018 - Blower Data

2.6.2. MMA024

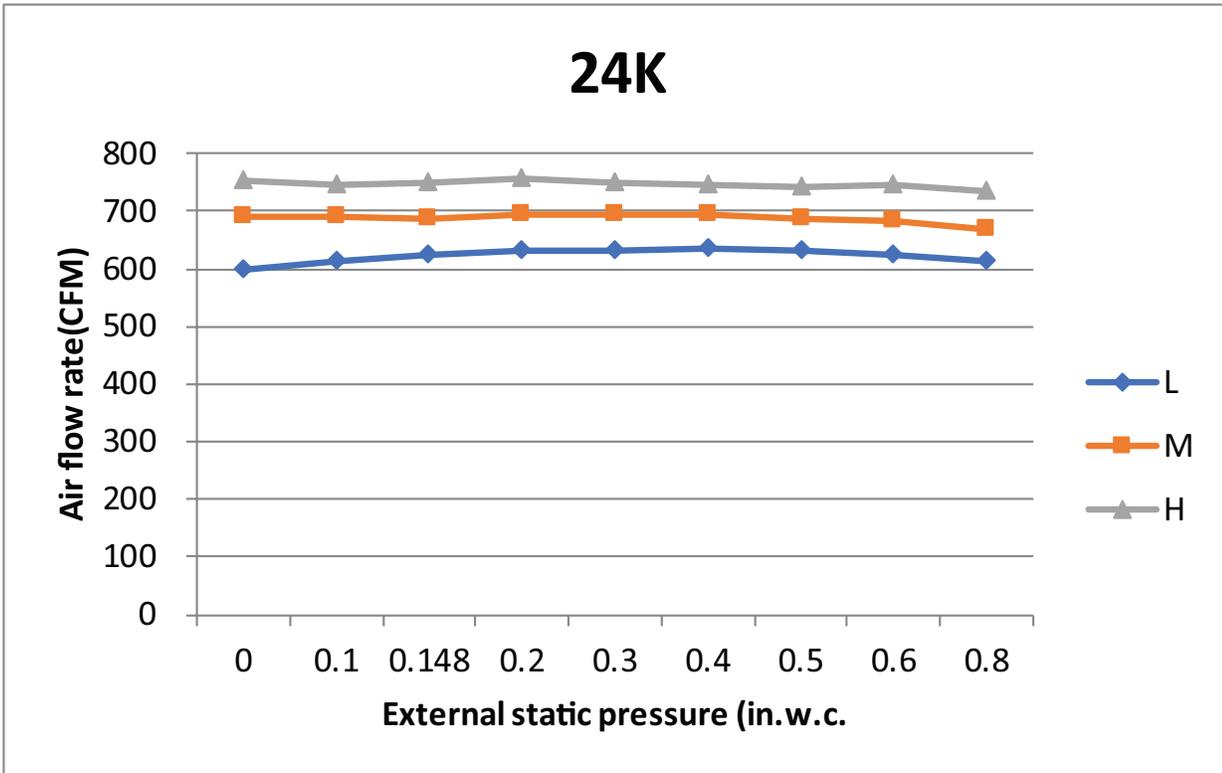


Figure 5. MMA024 - Blower Data

### 2.6.3. MMA036

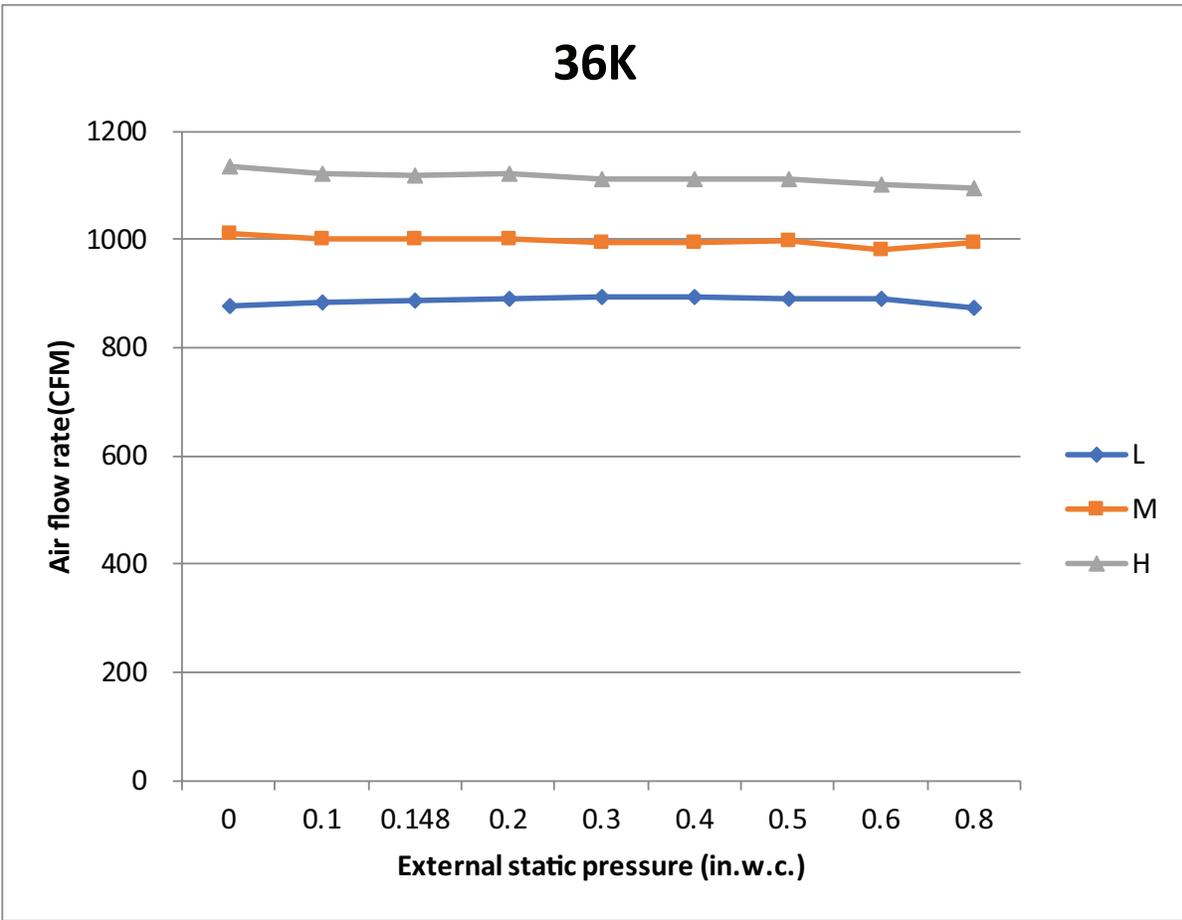
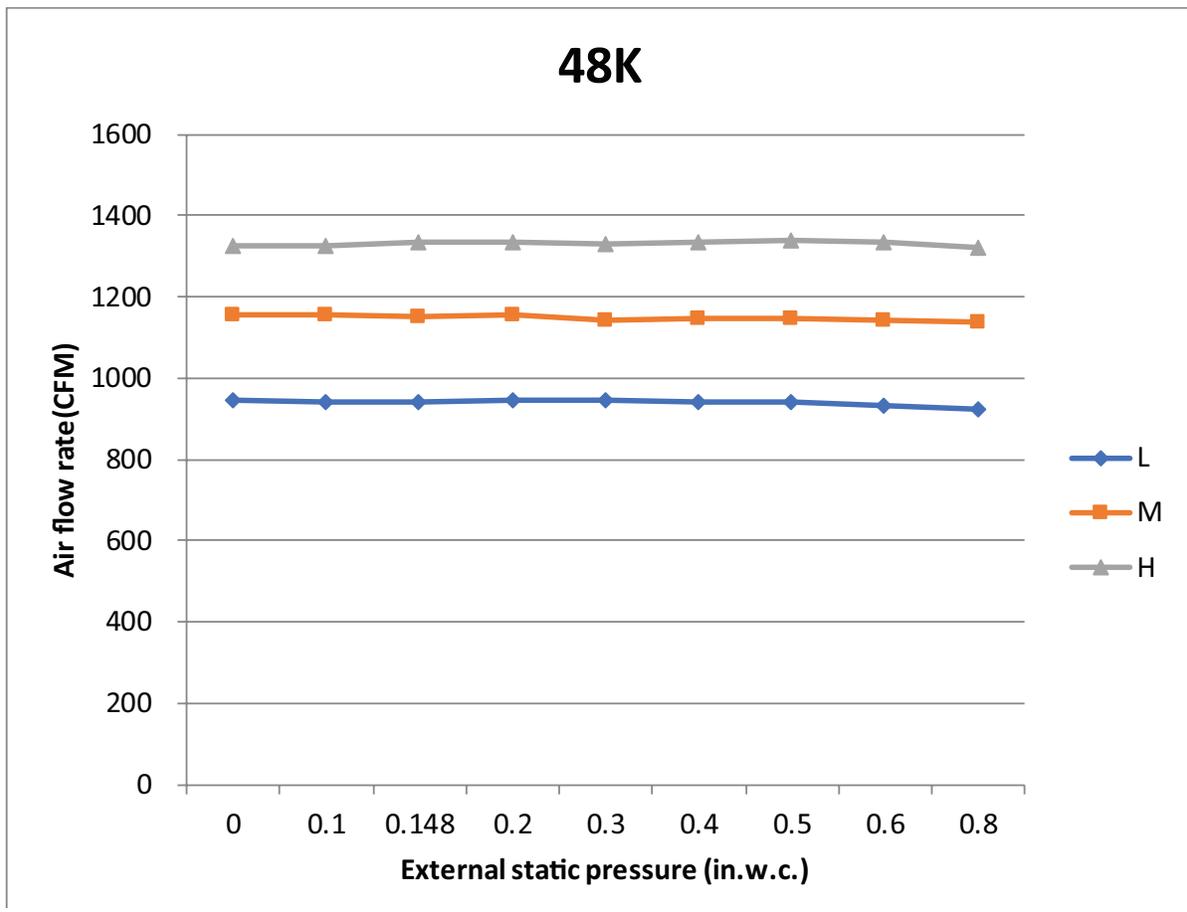


Figure 6. MMA036 - Blower Data

2.6.4. MMA048



2.6.5. MMA060

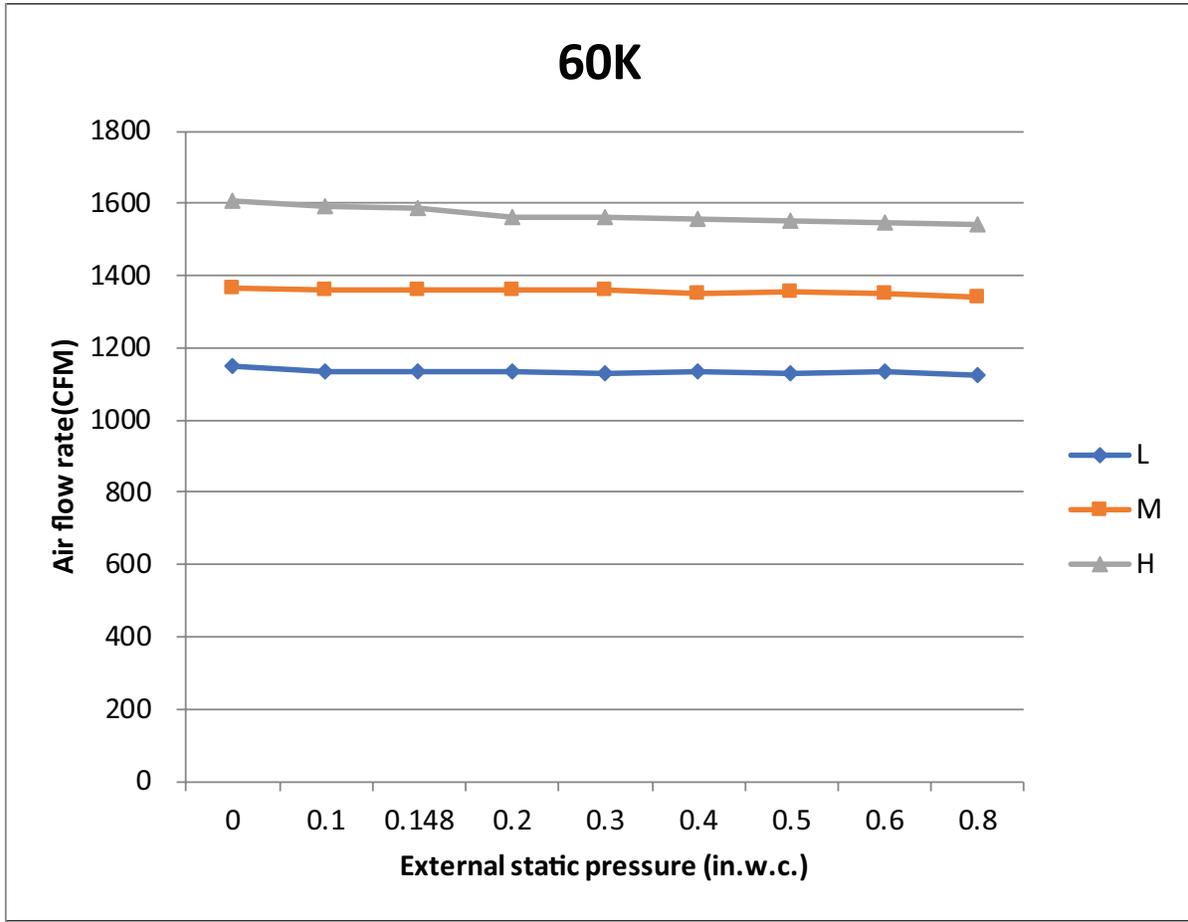
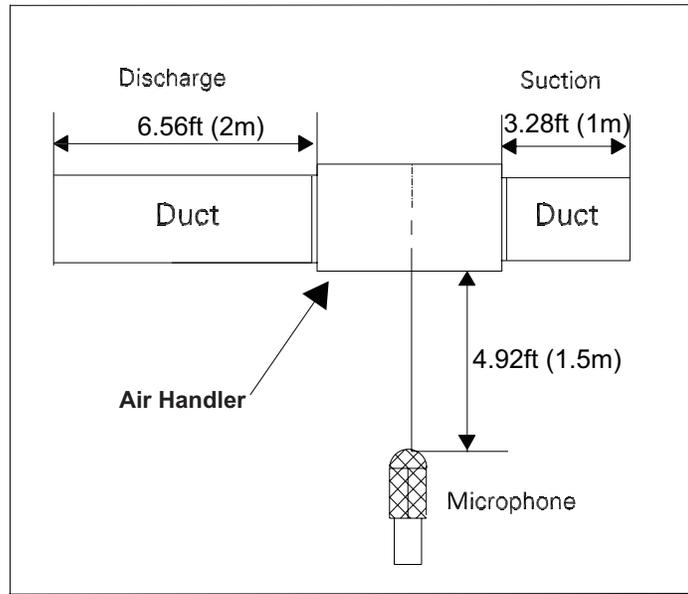


Figure 7. MMA060 - Blower Data

### 3. Noise Criterion Curves

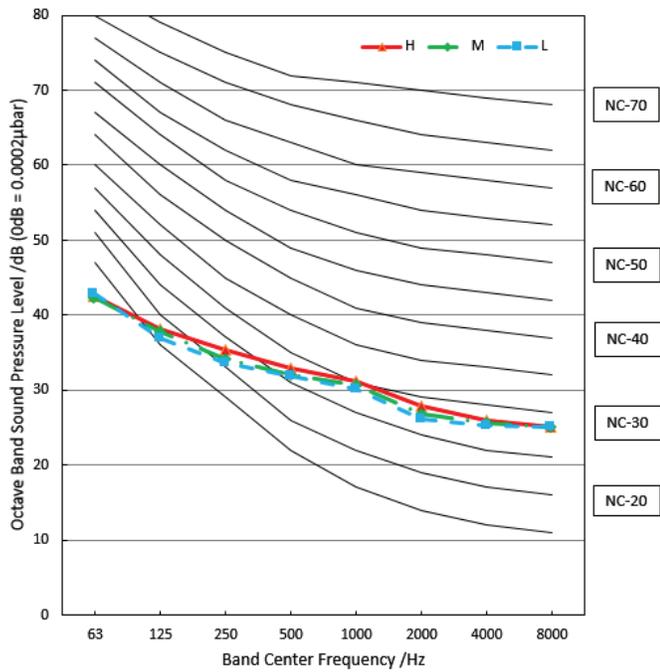


**Figure 8. Noise Measurement - Concealed Duct**

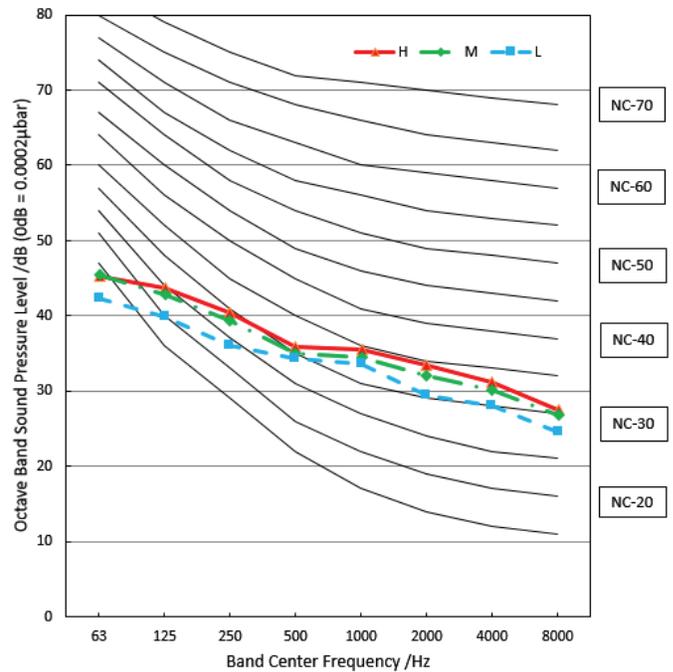
Sound is measured 4.92 ft (1.5m) away from the center of the air handler. Data is valid and gathered in free field and nominal operation conditions. The sound level will vary based on where the unit is installed.

Acoustic pressure  $OdB = 20\mu Pa$

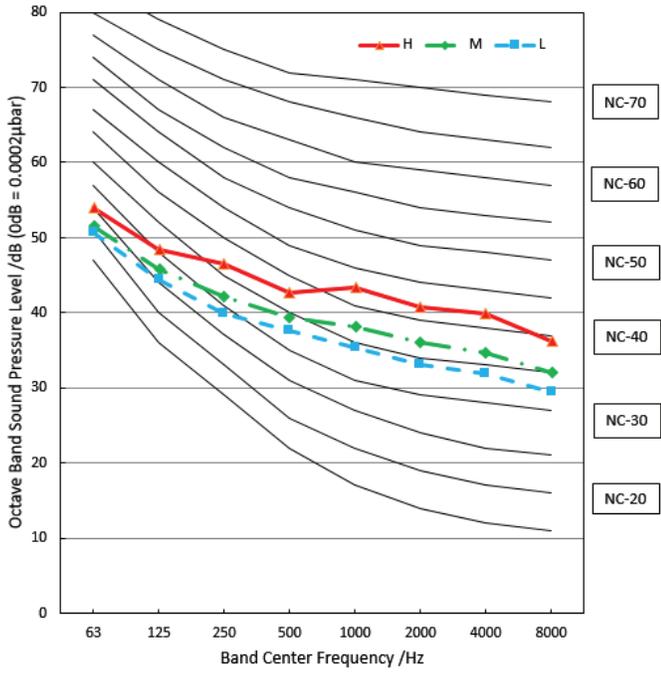
#### **MMA018**



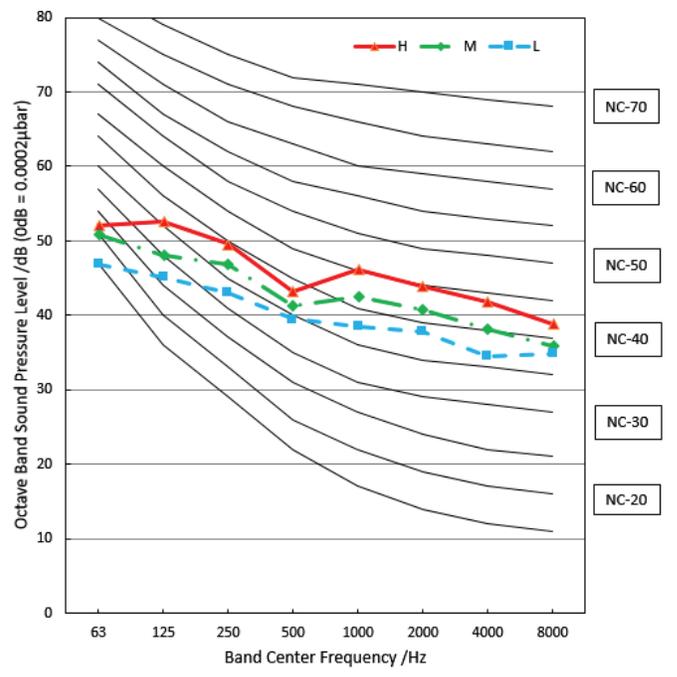
#### **MMA024**



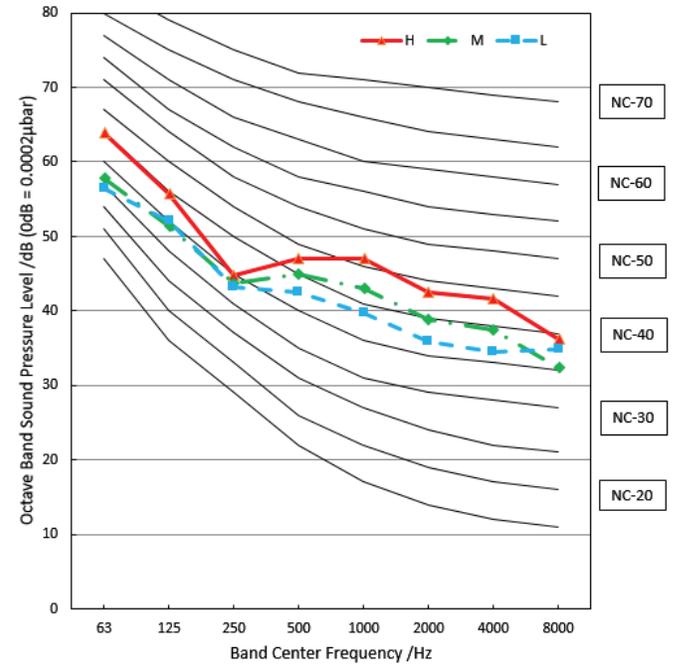
### MMA036



### MMA048



### MMA060



### 3.1. Indoor and Outdoor Power and Communication Wiring Requirements

#### CAUTION

This unit must be properly grounded and protected by a circuit breaker. The ground wire for the unit must not be connected to a gas or water pipe, a lightning conductor or a telephone ground wire.

Do not connect power wires to the outdoor unit until all other wiring and piping connections have been completed.

Install all wiring at least 3 feet (1 m) away from televisions, radios, LEDs, or other electronic devices in order to avoid the possibility of interference with the unit operation.

Do not install the unit near a lighting appliance that includes a ballast. The ballast may affect remote control operation.

#### WARNING

Isolate the power supply before accessing unit electrical terminals.

Install unit so that unit disconnect is accessible.

Follow all local and national codes, as well as this installation instruction, during installation. Do NOT overload electrical circuit, as this may lead to failure and possible fire.

Use specified wiring and cable to make electrical connections. Clamp cables securely and make sure that connections are tight to avoid strain on wiring. Insecure wiring connections may result in equipment failure and risk of fire. Wiring must be installed so that all cover plates can be securely closed.

In the U.S.A., wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC).

### 3.2. Overview

Refer to unit nameplate for minimum circuit ampacity and maximum over-current protection size.

- All indoor units are powered by the outdoor unit.
- Make all electrical power wiring connections at the outdoor unit.
- Size outdoor unit power per local code and power requirements.
- Connect wiring between indoor and outdoor terminals.
- Refer to unit name plate for rated voltage.
- Be sure to reattach all electrical box covers after connections are complete.
- Follow NEC/CEC standards and all local and state codes during wiring installation.

### 3.3. Indoor/Outdoor Unit Match-Ups

## IMPORTANT

The MMA036, MMA048, and MMA060 indoor units are only compatible with single zone outdoor models. The MMA036, MMA048, and MMA060 cannot be matched with multi-zone outdoor models.

#### Single Zone

Outdoor Unit	Indoor Unit	Voltage
MPC018S4S-*P	MMA018	208/230V
MPC024S4S-*P	MMA024	208/230V
MPC036S4S-*P	MMA036	208/230V
MPC048S4S-*P	MMA048	208/230V
MPC060S4S-*P	MMA060	208/230V
MLB018S4S-*P	MMA018	208/230V
MLB024S4S-*P	MMA024	208/230V
MLB036S4S-*P	MMA036	208/230V
MLB048S4S-*P	MMA048	208/230V

#### Multi-Zone

Outdoor Unit	Indoor Unit	Voltage
MPC024S4M-*P	MMA018 / MMA024	208/230V
MPC030S4M-*P	MMA018	208/230V
MPC036S4M-*P	MMA018 / MMA024	208/230V
MPC048S4M-*P	MMA018 / MMA024	208/230V
MLB030S4M-*P	MMA018	208/230V
MLB036S4M-*P	MMA018 / MMA024	208/230V
MLB048S4M-*P	MMA018 / MMA024	208/230V

#### Matching With Multi-Zone Outdoor Unit

Mode of Air Handler (MMA)	Mode of other IDU Zones	Mode Conflict Unit
Fan	Heating/Electric Heat/Emergency Heat	MMA
Cooling		MMA
Dehumidification		MMA
Heating	Fan/Cooling/Dehumidificaton	Other IDU Zones
Electric Heat		Other IDU Zones
Emergency Heat		Other IDU Zones

**NOTE:** When Heating reaches the temperature and shuts down with other IDU zones heating normally, the air handler's fan will stop running and the Fan-ON mode is invalid.

The heat pump will start synchronously when Emergency Heat or Electric Heat is started.

When two air handler units are connected by a multi-zone outdoor unit, the above rules apply. The second air handler unit is regarded as other IDU Zones.

### 3.4. Controller Compatibility

Indoor Unit	Controller
MMA018SM4-1P	M0STAT120N-1 (Mini-Split Wired Programmable Controller) 24-Volt Thermostat (optional)
MMA024SM4-1P	
MMA036S4-1P	
MMA048S4-1P	
MMA060S4-1P	

### 3.5. Electrical Wiring Diagrams

Abbreviation	Meaning
Y/G	Yellow - Green Conductor
CAP	Indoor Fan Capacitor
FAN	Indoor Fan Motor
ECM	Indoor Electronically Commutated Motor
T1	Indoor Room Temperature Sensor
T2A	Indoor Coil Inlet Temperature Sensor
T2B	Indoor Coil Outlet Temperature Sensor
T2	Indoor Coil Temperature Sensor

### 18-24K Wiring Diagram

**NOTE1:**

- 1.The parts with dotted line indicates optional features.
- 2.Remove the short connector of JR1 when you use the "on-off" function.
- 3.Remove the short connector of J1 when you use the "WATER LEVEL SWITCH" function.
4. This symbol indicates the element is optional, the actual shape shall prevail.

**WIRING DIAGRAM**

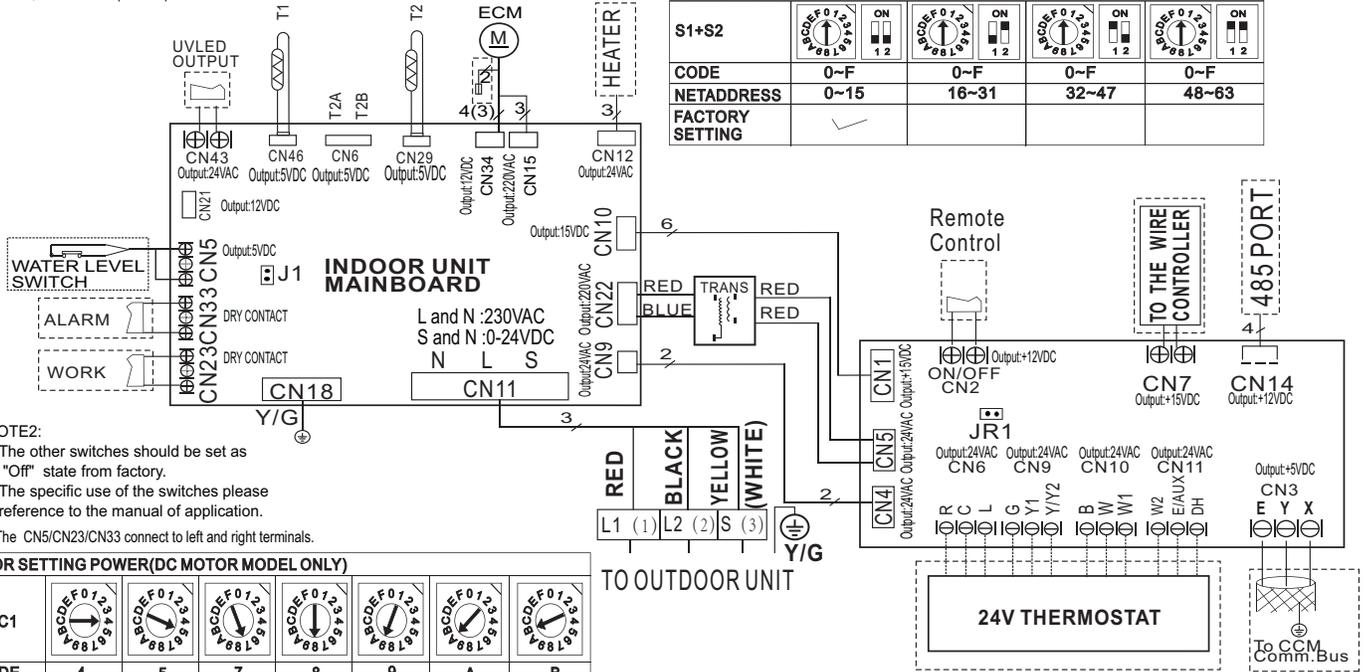
CODE	PART NAME
ECM	INDOOR ECM MOTOR
CAP	INDOOR FAN CAPACITOR
FAN	INDOOR FAN MOTOR
T1	ROOM TEMP.SENSOR
T2	COIL TEMP.SENSOR
T2A	INDOOR COIL INLET TEMP.SENSOR
T2B	INDOOR COIL OUTLET TEMP.SENSOR

**24V THERMOSTATS SETTING**

	S3	SW1	SW2	SW3	SW4	S4
CODE	0~F	ON~OFF	ON~OFF	ON~OFF	ON~OFF	ON~OFF
FACTORY SETTING	✓	✓	✓	✓	✓	✓

**FOR SETTING NETADDRESS**

	S1+S2				
CODE	0~F	0~F	0~F	0~F	0~F
NETADDRESS	0~15	16~31	32~47	48~63	
FACTORY SETTING	✓				



**NOTE2:**

- 1.The other switches should be set as "Off" state from factory.
- 2.The specific use of the switches please reference to the manual of application.
- 3.The CN5/CN23/CN33 connect to left and right terminals.

**FOR SETTING POWER(DC MOTOR MODEL ONLY)**

ENC1	4	5	7	8	9	A	B
CAPACITY	≤53	54~71	72~90	91~105	106~140	141~160	≥161
FACTORY SETTING	ACCORDING TO RELATED MODEL.						

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# 36-60K Wiring Diagram

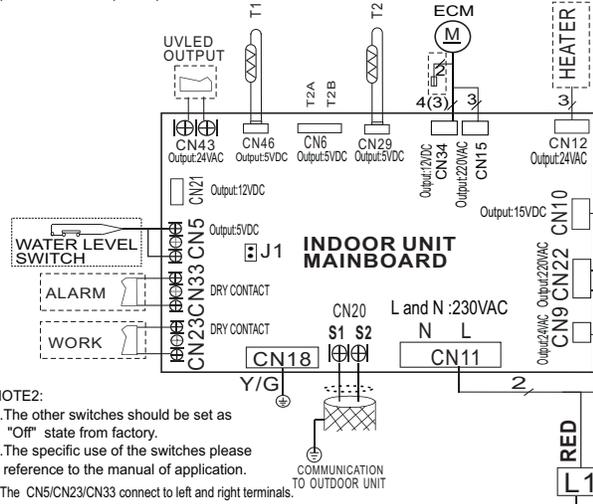
NOTE1:  
 1. The parts with dotted line indicates optional features.  
 2. Remove the short connector of JR1 when you use the "on-off" function.  
 3. Remove the short connector of J1 when you use the "WATER LEVEL SWITCH" function.  
 4. This symbol indicates the element is optional, the actual shape shall prevail.

WIRING DIAGRAM

CODE	PART NAME
ECM	INDOOR ECM MOTOR
T1	ROOM TEMP.SENSOR
T2	COIL TEMP.SENSOR
T2A	INDOOR COIL INLET TEMP.SENSOR
T2B	INDOOR COIL OUTLET TEMP.SENSOR

24V THERMOSTATS SETTING

	S3	SW1	SW2	SW3	SW4	S4
CODE	0~F	ON~OFF	ON~OFF	ON~OFF	ON~OFF	ON~OFF
FACTORY SETTING	✓	✓	✓	✓	✓	✓



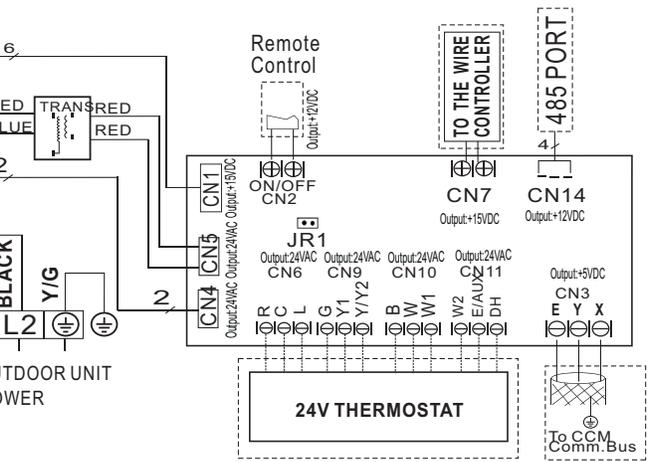
FOR SETTING NETADDRESS

S1+S2	ON	ON	ON	ON
CODE	0~F	0~F	0~F	0~F
NETADDRESS	0~15	16~31	32~47	48~63
FACTORY SETTING	✓			

NOTE2:  
 1. The other switches should be set as "Off" state from factory.  
 2. The specific use of the switches please reference to the manual of application.  
 3. The CN5/CN23/CN33 connect to left and right terminals.

FOR SETTING POWER(DC MOTOR MODEL ONLY)

ENC1	ENC2	ENC3	ENC4	ENC5	ENC6	ENC7
CODE	4	5	7	8	9	A B
CAPACITY	≤53	54~71	72~90	91~105	106~140	141~160 ≥161
FACTORY SETTING	ACCORDING TO RELATED MODEL.					



16023000A74403

## 3.6. Wiring Guide

Table 1. Single Zone Mini-Split Wiring Guide

Systems	System Capacity	System Voltage	Number of Conductors	Wire Type	Wire Gauge
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	18K	208/230 VAC	4	Stranded	16AWG*4 Stranded, unshielded
Outdoor to Main Power L1, L2 and GND	18K	208/230 VAC	3	Stranded	MCA: 18A 14AWG*3
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	24K	208/230 VAC	4	Stranded	16AWG*4 Stranded, unshielded
Outdoor to Main Power L1, L2 and GND	24K	208/230 VAC	3	Stranded	MCA: 20A 12AWG*3
Indoor to Outdoor Wiring (Power only) L1, L2 and GND	36K	208/230 VAC	3	Stranded	16AWG*3 Stranded, unshielded
Indoor to Outdoor Wiring (Communication only) (S1, S2 and GND)	36K	208/230 VAC	3	Stranded (shielded)	24AWG*3
Outdoor to Main Power L1, L2 and GND	48K	208/230 VAC	3	Stranded	MCA: 30A 10AWG*3
Indoor to Outdoor Wiring (Power only) L1, L2 and GND	48K	208/230 VAC	3	Stranded	16AWG*3 Stranded, unshielded

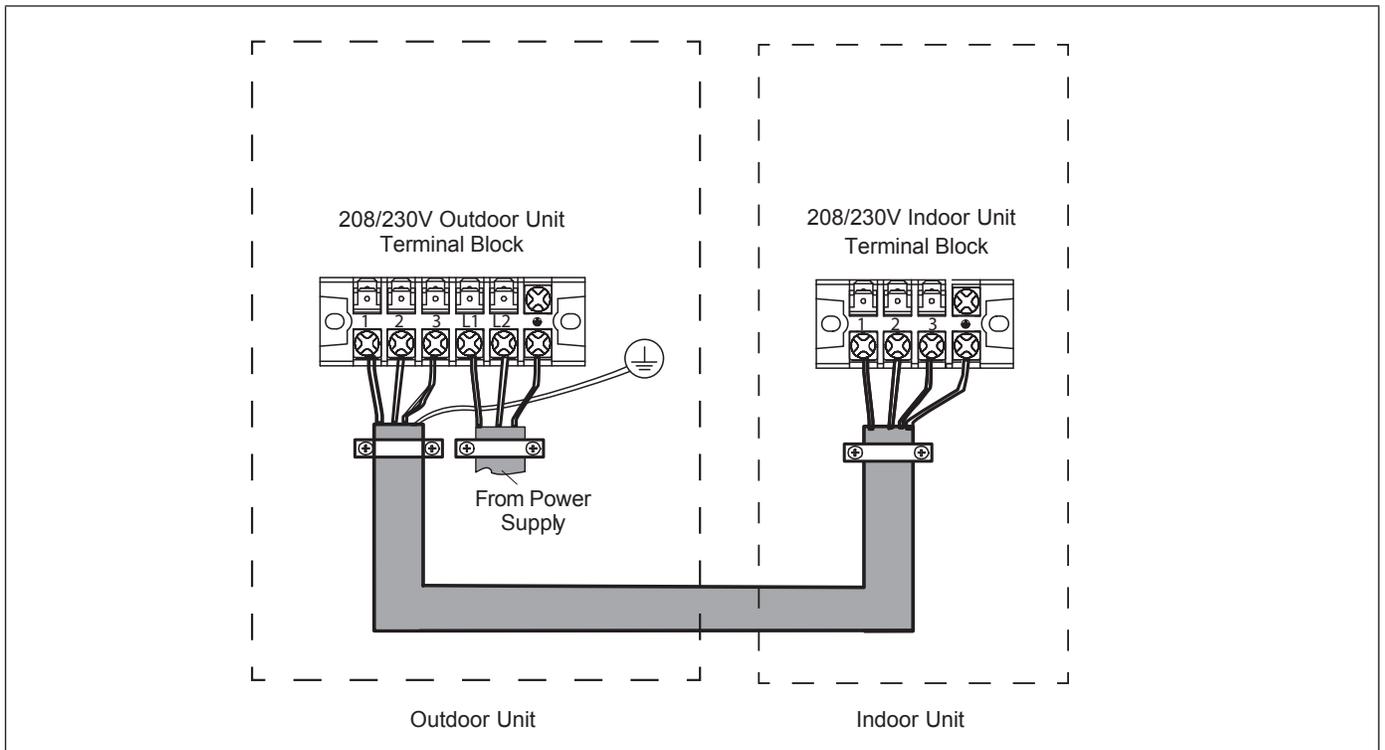
**Table 1. Single Zone Mini-Split Wiring Guide**

Systems	System Capacity	System Voltage	Number of Conductors	Wire Type	Wire Gauge
Indoor to Outdoor Wiring (Communication only) (S1, S2 and GND)	60K	208/230 VAC	3	Stranded (shielded)	24AWG*3
Outdoor to Main Power L1, L2 and GND	60K	208/230 VAC	3	Stranded	MCA: 35A 8AWG*3

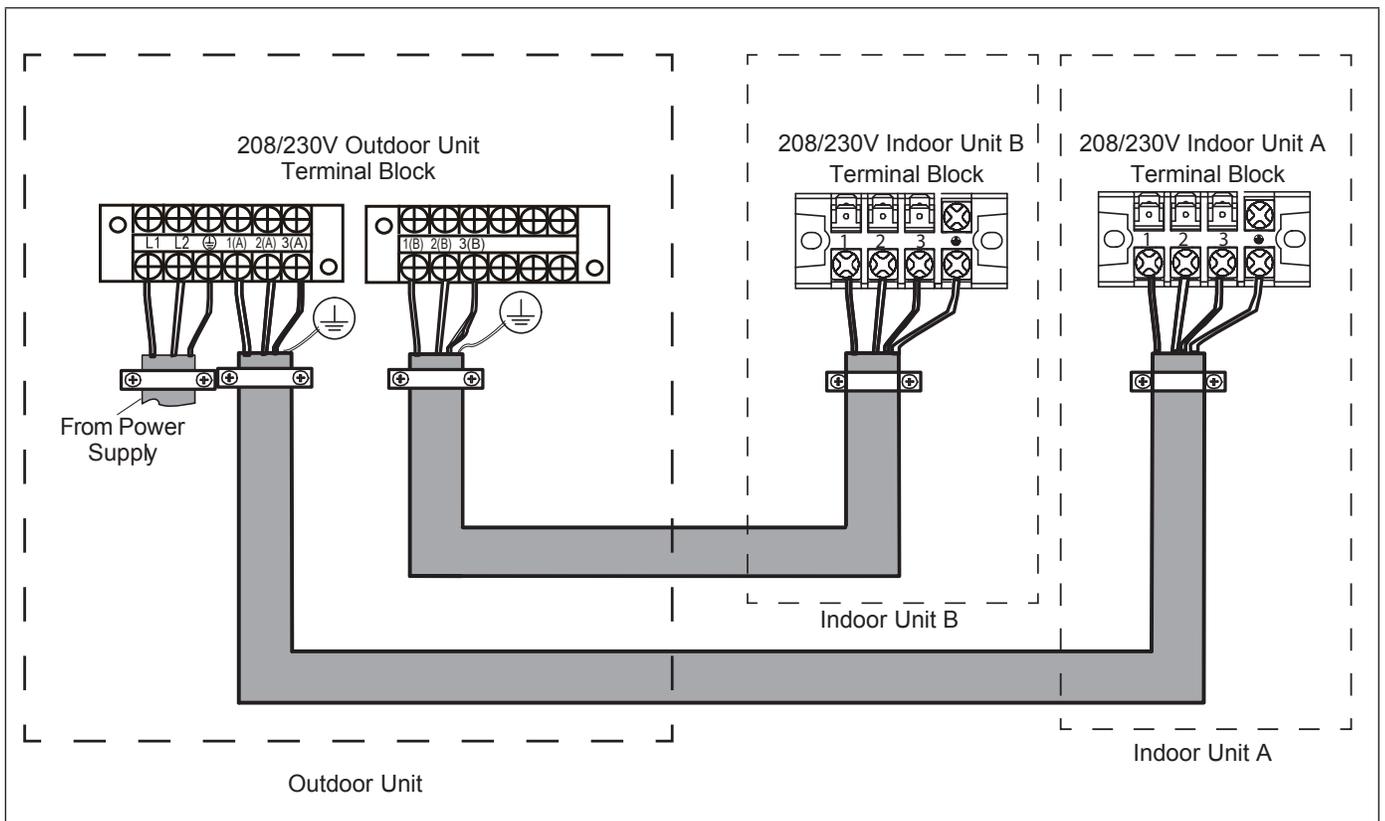
**Table 2. Multi-Zone Installation Wiring Requirements**

System and Terminal Designations	System Capacity	System Voltage	Number of Conductors	Wire Type	Wire Gauge / MCA
<b>Indoor to Outdoor Unit</b>					
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	18K	208/230VAC	4	Stranded and unshielded	16AWG
Outdoor to Main Power L1, L2 and GND	18K	208/230VAC	3	Stranded and unshielded	14AWG / 18A
Indoor to Outdoor Wiring (Communication/Power) 1, 2, 3 and GND	24K	208/230VAC	4	Stranded and unshielded	16AWG
<b>Multi-Zone Outdoor Unit to Main Power</b>					
Outdoor to Main Power L1, L2 and GND	18K	208/230VAC	3	Stranded and unshielded	14AWG / 18A
Outdoor to Main Power L1, L2 and GND	24K	208/230VAC	3	Stranded and unshielded	12AWG / 22A
Outdoor to Main Power L1, L2 and GND	30K	208/230VAC	3	Stranded and unshielded	16AWG
Outdoor to Main Power L1, L2 and GND	36K	208/230VAC	3	Stranded and unshielded	10AWG / 30A
Outdoor to Main Power L1, L2 and GND	48K	208/230VAC	3	Stranded and unshielded	8AWG / 35A
MCA = Minimum Circuit Amps					

### 3.7. Terminal Connections



**Figure 9. Single-Zone Wiring 24K and Below**



**Figure 10. Multi-Zone Wiring 24K**

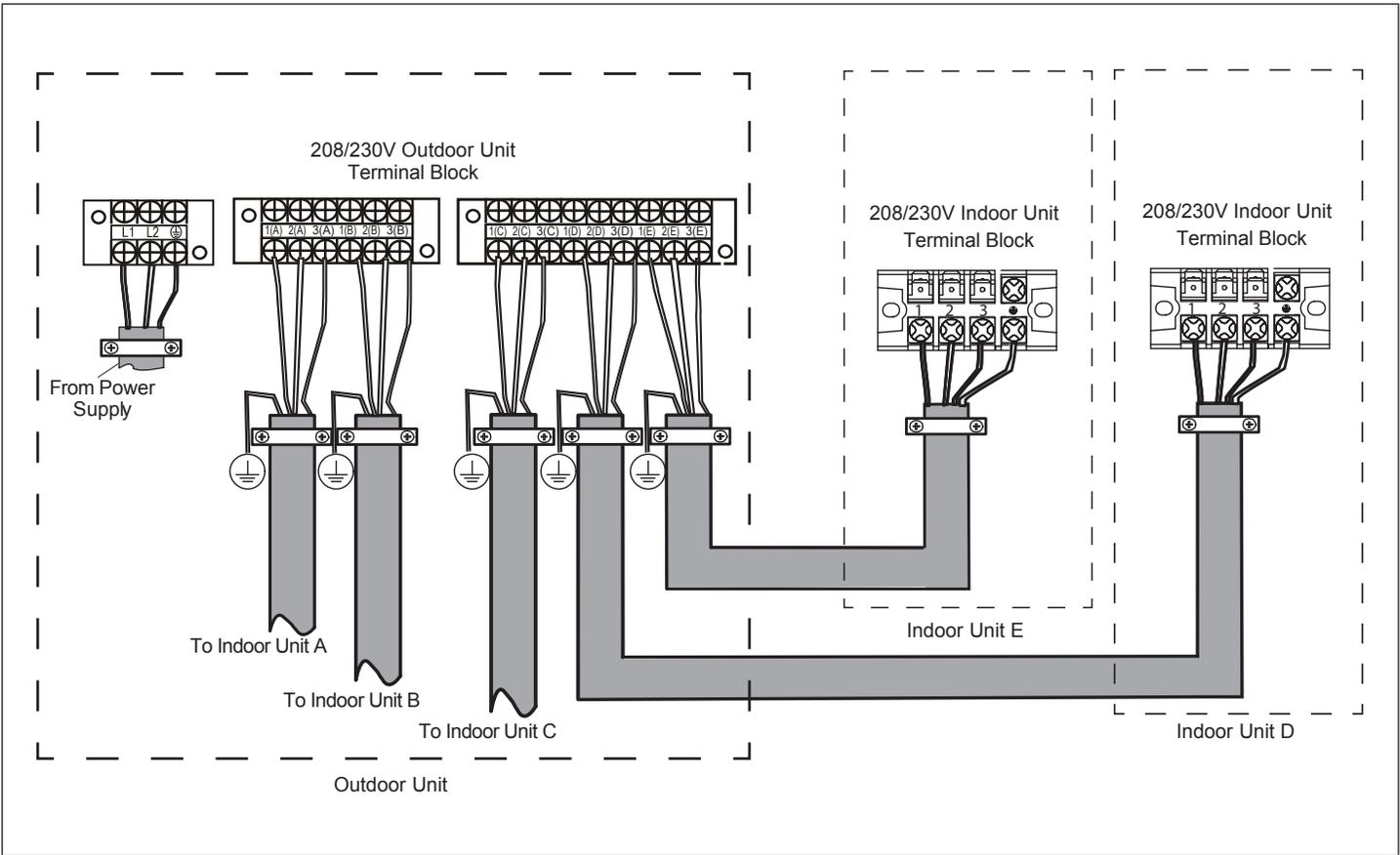


Figure 11. Multi-Zone Wiring

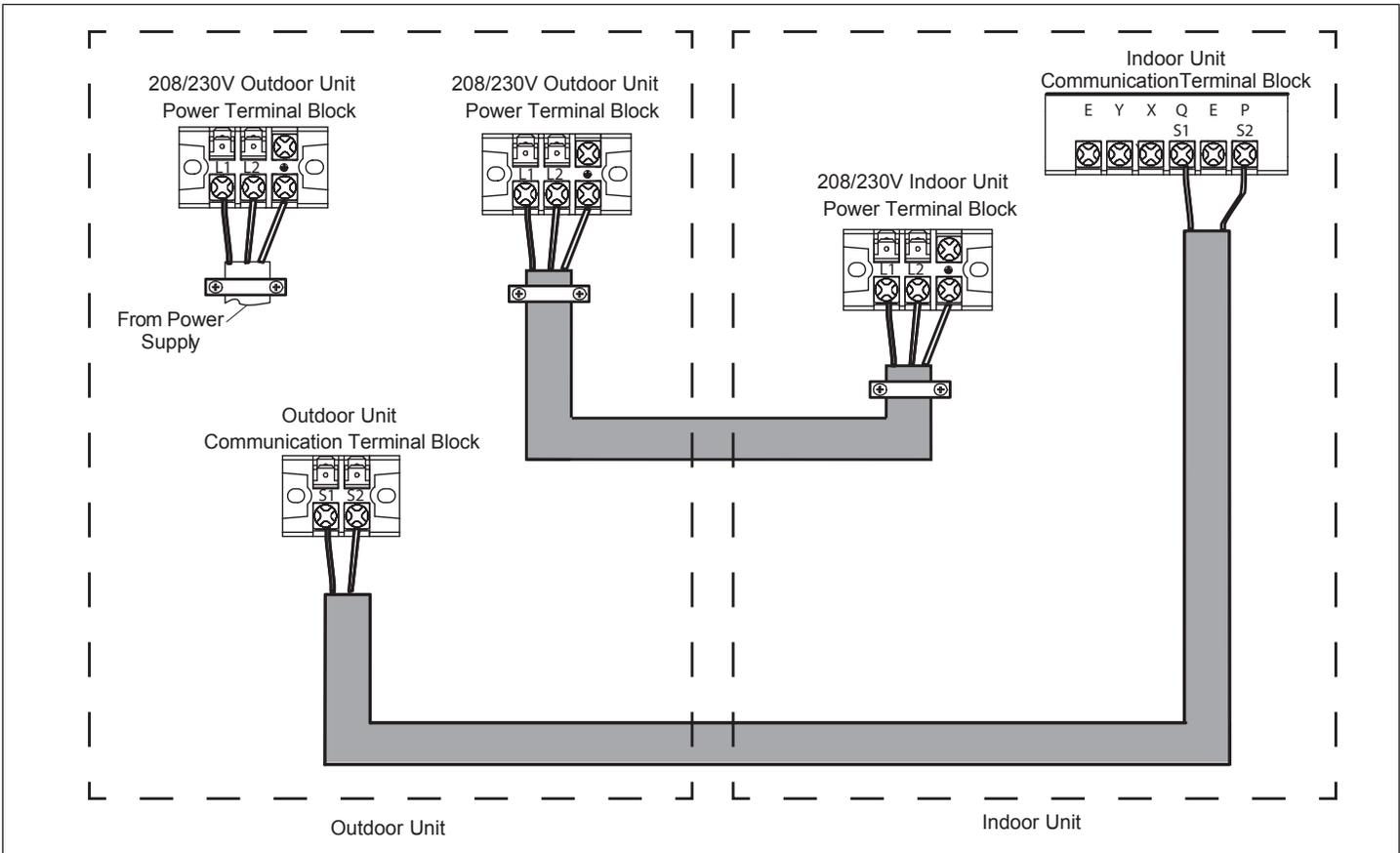


Figure 12. Communication - Single-Zone Wiring 36K - 60K Only

## 4. Connection to Centralized Controller, ON/OFF and Alarm Devices

### 4.1. Centralized Controller

Mini-Split indoor units can be connected to a centralized controller (e.g. Lennox VRF Manager - LVM or Trane Tracer) or a BACnet or Lonworks gateway using the X, Y, E terminals on the indoor unit main board.

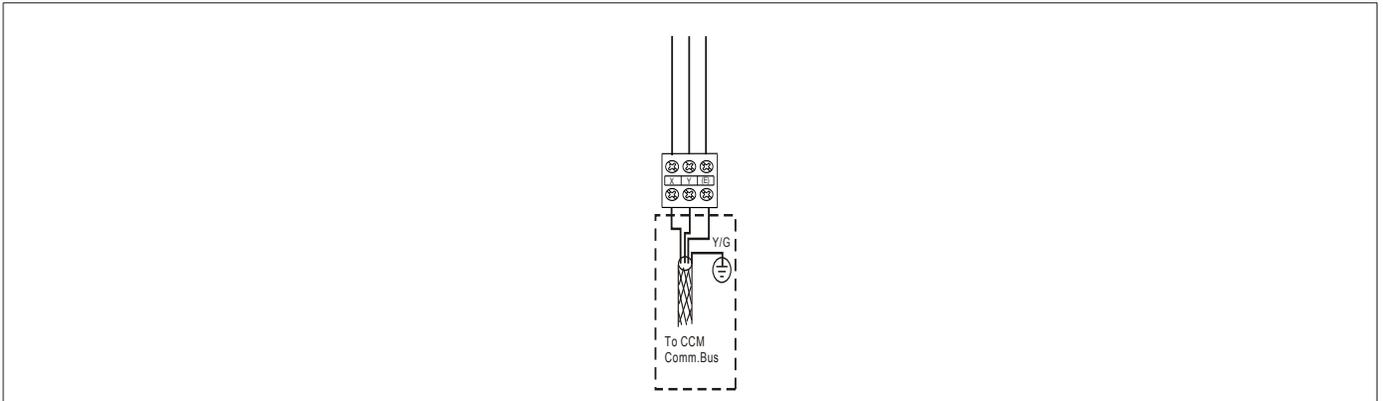


Figure 13. Typical Central Controller Connection Point Example

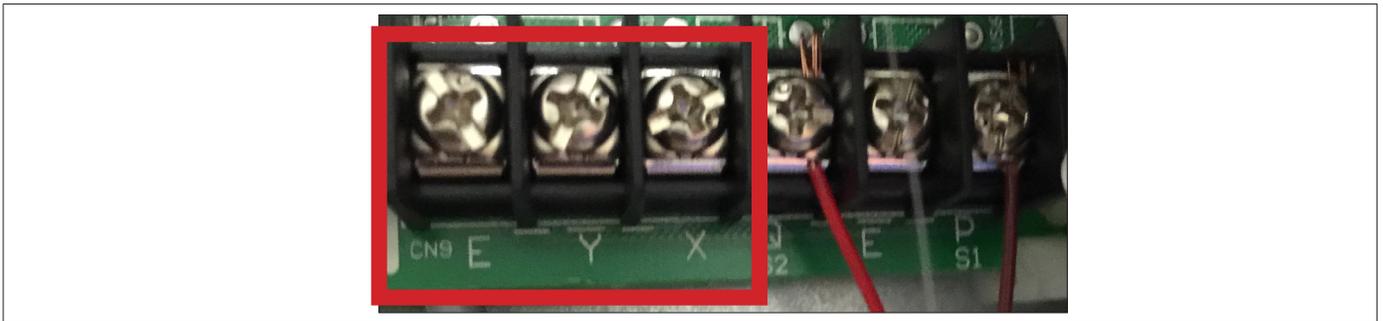


Figure 14. Typical Central Controller Connection Point Example 2

### 4.2. ON/OFF Devices

Mini-Split indoor units can be connected to an external device such as a fire alarm system using two dry contacts on the indoor unit main board. These dry contacts allow the external device to turn the indoor unit on or off.

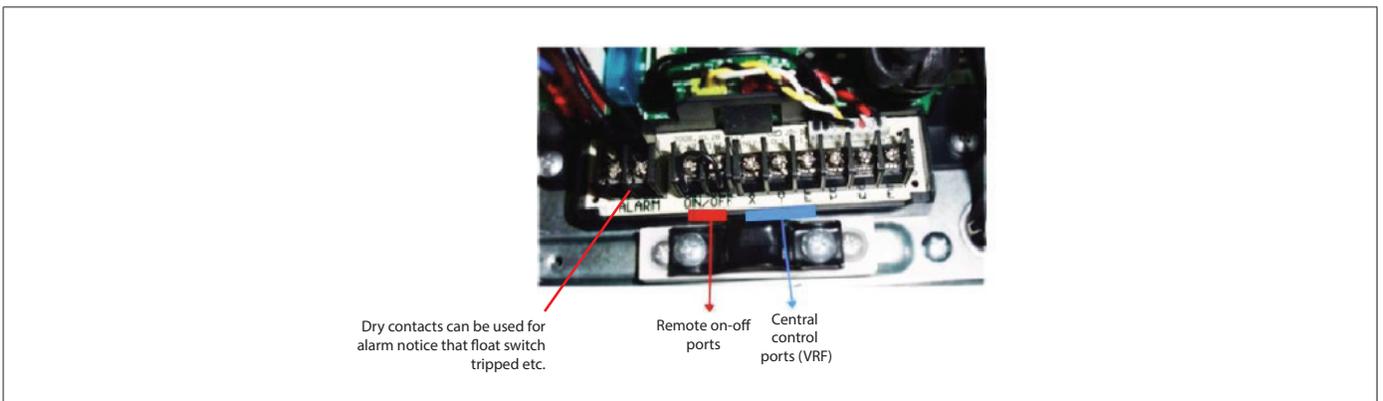


Figure 15. Indoor Unit Connection Points for ON/OFF

### 4.3. Alarm Devices

Mini-Split indoor units can be connected to an alarm device such as a light or buzzer using two dry contacts on the indoor unit main board.

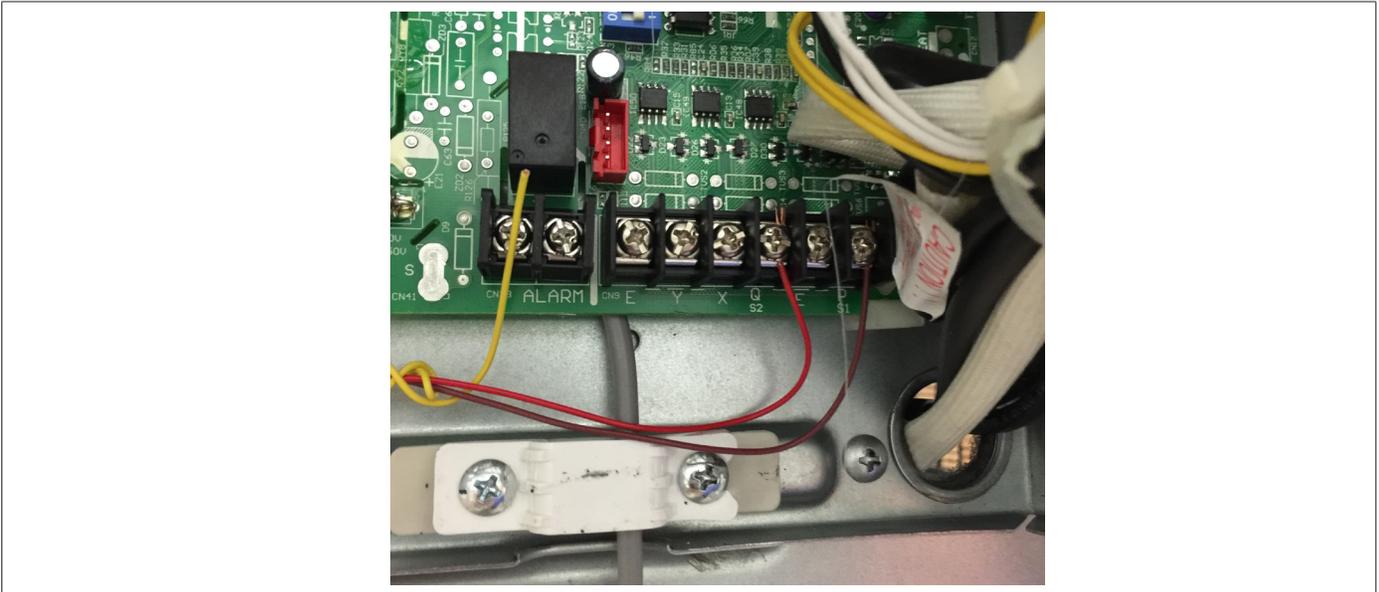
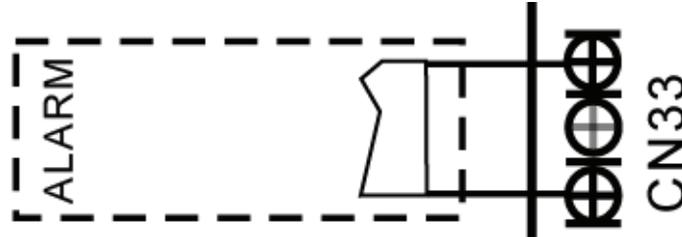


Figure 16. Alarm Device Connection Points (Typical)

### 4.4. Micro-Switch Introduce

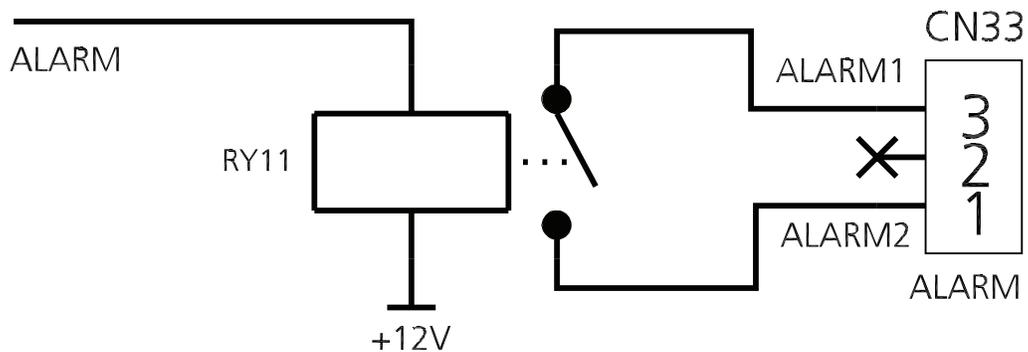
#### Alarm Terminal Port

(CN33)



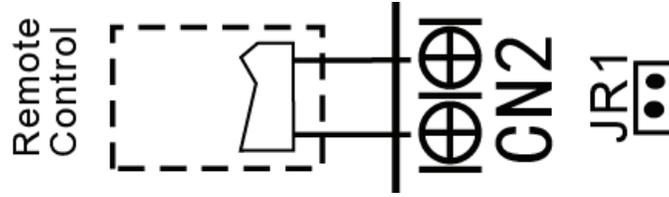
Connect the power; it must be less than 24V.

The current is less than 0.5A. If the unit encounters a problem, the relay closes and the alarm functions.



## Remote Control Terminal

(ON-OFF, CN2, Short Connector JR1)

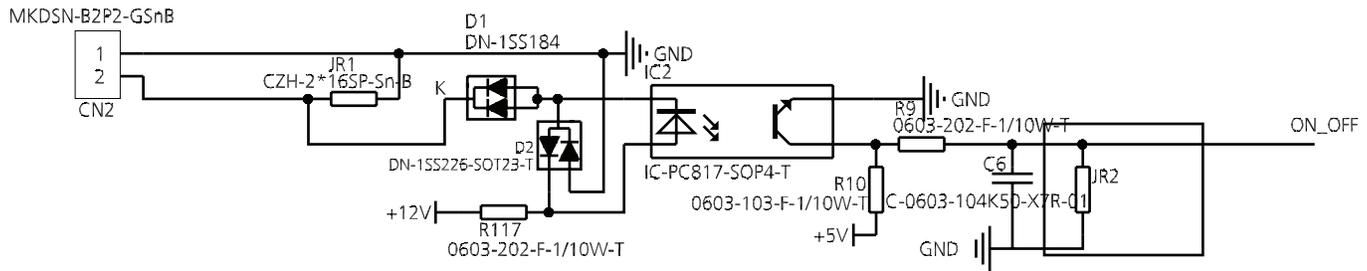


**NOTE:** Remove the short connector (JR1) when using the ON-OFF function.

Remote Switch	Unit Status	Demand Response Time
ON (close) <sup>1</sup>	Unit is on.	Within two (2) seconds
OFF (open) <sup>2</sup>	Unit is off.	Within two (2) seconds

1. Unit responds to demand; use the remote controller to select the required mode.  
2. Unit will not respond to the demand from the remote controller.

**NOTE:** If the remote switch is off, but the remote controller is on, the CP code appear on the display board.



**NOTE:** The voltage of the port (CN2) is 12V DC; maximum current is 5mA.

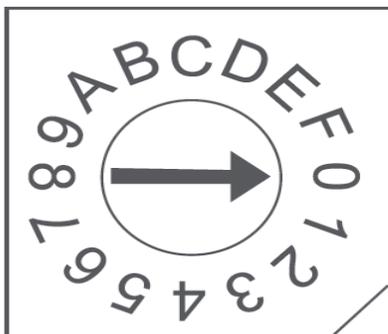
## 4.5. Dial Codes

**NOTE:** The SW4 DIP switch is for certified service technical use only.

No.	Dial Code	Control Scenario	Function	ON	OFF	Note
1	SW1-2	1,2	Anti-cold blow protection option	NO	[Default] YES	
2	SW1-3	1,2,3	Single cooling / heating and cooling options	Cooling	[Default] Cooling & Heating	
3	SW2-1	1	Compressor Running (demand working with heat pump+ Electric heat)	Compressor slower speed	[Default] Faster Compressor	Only affects compressor and W1
4	SW2-1	2	Temperature differential to activate first stage auxiliary heat(the GAP of T1 and Ts),Wire controller demand with heat pump+Electric heat working together	2°F (1°C)	[Default] 4°F (2°C)	
5	SW2-2	2	Electric heat on delay	YES	[Default]NO	
6	SW2-3	2	Electric auxiliary heating delay to start time	30 minutes	[Default] 15 minutes	Based on SW2-2 is ON

No.	Dial Code	Control Scenario	Function	ON	OFF	Note
7	SW2-4	2	Compressor/Auxiliary heat outdoor ambient lockout	The compressor will not operate if the outdoor temperature is lower than the temperature represented by S3	[Default] The heater will not operate if the outdoor temperature is greater than the temperature represented by S3	SW2-4 and S3 need to working together
8	Rotary Switch S3	2	Set outdoor temperature Limitation (for auxiliary heating or compressor)	0 means that the temperature protection is not turned on, the dial range is 1 through F, 1 equals -4°F and it increase up to 46°F. See "Table 2. Dial Range Table" on page 29.		
9	SW3-1	1	Maximum continuous runtime allowed before system automatically stages up capacity to satisfy set point. This adds 1 to 5°F to the user set point in the calculated control point to increase capacity and satisfy user set point	30 minutes	[Default] 90 minutes	
10	SW3-2	1	Cooling and heating Y/Y2 temperature differential adjustment.	Compressor slower speed	[Default] Faster Compressor	Only affects compressor
11	SW3-3	1	Compressor Running (demand working with heat pump+ Electric heat)	Compressor slower speed	[Default] Faster Compressor	Only affects compressor and W2
12	SW3-3	2	Temperature differential to activate second stage auxiliary heating(the GAP of T1 and Ts) Wire controller demand with heat pump+Electric heat working together	4°F (2°C)	[Default] 6°F (3°C)	
13	SW3-4	1,3	Fan speed of cooling mode when 24V Thermostat is applied for.	Turbo	High	
14	SW4	1,2,3	Electric heat nominal CFM adjustment	Available settings are 000/001/010/011. Each digit corresponds an individual switch position. For example [SW4-1 OFF, SW4-2 ON, SW4 -3 OFF] = 010		
15	S4-1	1,3	Default ON	[Default] For single stage supplemental heat, W1 and W2 are connected	For dual stage supplemental heat, W1 and W2 are controlled independently	
16	S4-2	1,3	DH function selection	[Default] Dehumidification control not available	Dehumidification feature is enabled through thermostat	

Control Scenario	24V Thermostat, S1 + S2	1
	Wired Controller S1 + S2	2
	Full 24V	3



S3	S3 (°F)	S3 (°C)
0	OFF	OFF
1	-4	-20
2	0	-18
3	3	-16
4	7	-14
5	10	-12
6	14	-10
7	18	-8
8	21	-6
9	25	-4
A	28	-2
B	32	0
C	36	2
D	39	4
E	43	6
F	46	8

**Table 3. Dial Range Table**

## DIP Switch S1 and S2

### Address dialing S1+S2:

Address dialing is required when using the centralized controller.

### Network address:

- The address silkscreen is NET address, which is composed of a 16-bit address rotary code S2 plus a two-digit DIP switch S1 (Set during engineering installation, no network function needs to be set)
- When S2 is 00 (the dialing code is not connected), the network address value is S2
- When S2 is 10 (corresponding to the switch of the hardware connected to the 10K resistor), the network address value is S2 plus 32
- Determined by dial code S2 1-10K 2-5.1K. When S2 is 01 (corresponding to the dial code of the 5.1K resistor connected to the hardware is turned on), the network address value is S2 plus 16
- When S2 is 11 (all dialing codes are on), the network address value is S2 plus 48.

**NOTE:** The SW4 DIP switch is for certified service technician use only.

### Determined by Dial Code S2 1-10K 2-5.1K

Dial code selection	Website address
	S2 + 48
	S2 + 32
	S2 + 16
	S2

24V Input Terminal												
Mode	Priority	G	Y1	Y/Y2	B	W	W1	W2	E/AUX	DH/DS/BK	Fan speed	Display
OFF	/	0	0	0	0	0	0	0	0	*	OFF	0
FAN	7	1	0	0	*	0	0	0	0	*	Low	1
Cooling stage 1	6	*	1	0	0	0	0	0	0	1	Mid	2
Cooling stage 2		*	*	1	0	0	0	0	0	1	High	3
Dehumidification		*	1	0	0	0	0	0	0	0	Low	4
Dehumidification		*	*	1	0	0	0	0	0	0	Low	5
Heat pump stage 1	5	*	1	0	1	0	0	0	0	1	Mid	6
Heat pump stage 2		*	*	1	1	0	0	0	0	1	High	
Heat pump stage 2		*	*	*	*	1	0	0	0	1	High	7
Electric heater kit 1	3	*	0	0	*	0	1	0	0	*	Turbo	8
Electric heater kit 2		*	0	0	*	0	0	1	0	*	Turbo	
Electric heater kit 1 and kit 2		*	0	0	*	0	1	1	0	*	Turbo	9
Heat pump stage 1 + Electric heater kit 1	4	*	1	0	1	0	1	0	0	1	Turbo	10
Heat pump stage 1 + Electric heater kit 2		*	1	0	1	0	0	1	0	1	Turbo	
Heat pump stage 2 + Electric heater kit 1		*	*	1	1	0	1	0	0	1	Turbo	
Heat pump stage 2 + Electric heater kit 1		*	*	*	*	1	1	0	0	1	Turbo	
Heat pump stage 2 + Electric heater kit 2		*	*	1	1	0	0	1	0	1	Turbo	
Heat pump stage 2 + Electric heater kit 2		*	*	*	*	1	0	1	0	1	Turbo	
Heat pump stage 1 + Electric heater kit 1 and kit 2		*	1	0	1	0	1	1	0	1	Turbo	
Heat pump stage 2 + Electric heater kit 1 and kit 2		*	*	1	1	0	1	1	0	1	Turbo	
Heat pump stage 2 + Electric heater kit 1 and kit 2	*	*	*	*	1	1	1	0	1	Turbo	11	

24V Input Terminal												
Mode	Priority	G	Y1	Y/Y2	B	W	W1	W2	E/AUX	DH/DS/BK	Fan speed	Display
Emergency heat	1	*	*	*	*	*	*	*	1	*	Turbo	12
Heating zone control	2	*	1	0	1	0	*	*	0	0	Low	13
Heating zone control		*	*	1	1	0	*	*	0	0	Low	
Heating zone control		*	*	*	*	1	*	*	0	0	Low	
Heating zone control		*	0	0	*	0	1	0	0	0	Low	
Heating zone control		*	0	0	*	0	0	1	0	0	Low	
Heating zone control		*	0	0	*	0	1	1	0	0	Low	
<b>NOTE:</b> 1: 24V signal 0: No 24V signal *: 1 or 0. The air handler unit will turn off if the 24V input cannot meet the table.												

## 5. Connecting Cables

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

**Table 4. Wire Gauge**

Unit	Gauge
1 drive 2 type (24K outdoor unit)	14
1 drive 3 type (30K outdoor unit).	14
1 drive 4 type (36K outdoor unit)	12
1 drive 5 type (48K outdoor unit)	10

# Outdoor Unit Information

## 6. Single and Multi-Zone Outdoor Units

**NOTE:** Outdoor units can only be installed in an unenclosed outdoor environment.

### ⚠ WARNING

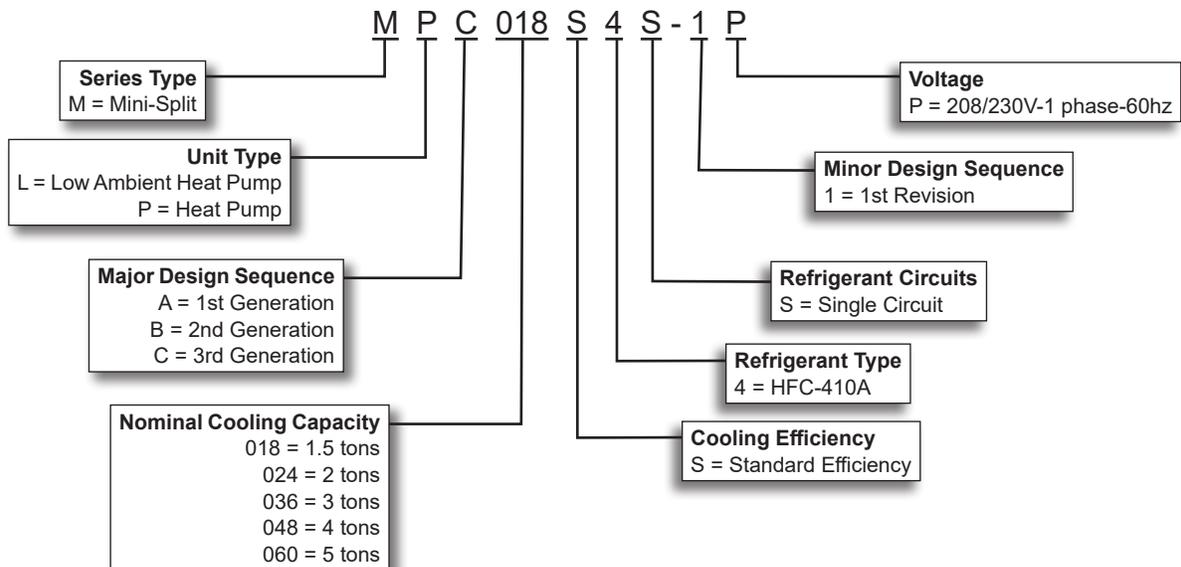
The clean Air Act of 1990 bans the intentional venting of refrigerant (CFCs, HCFCs, and HFCs) as of July, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for non-compliance.

### ⚠ CAUTION

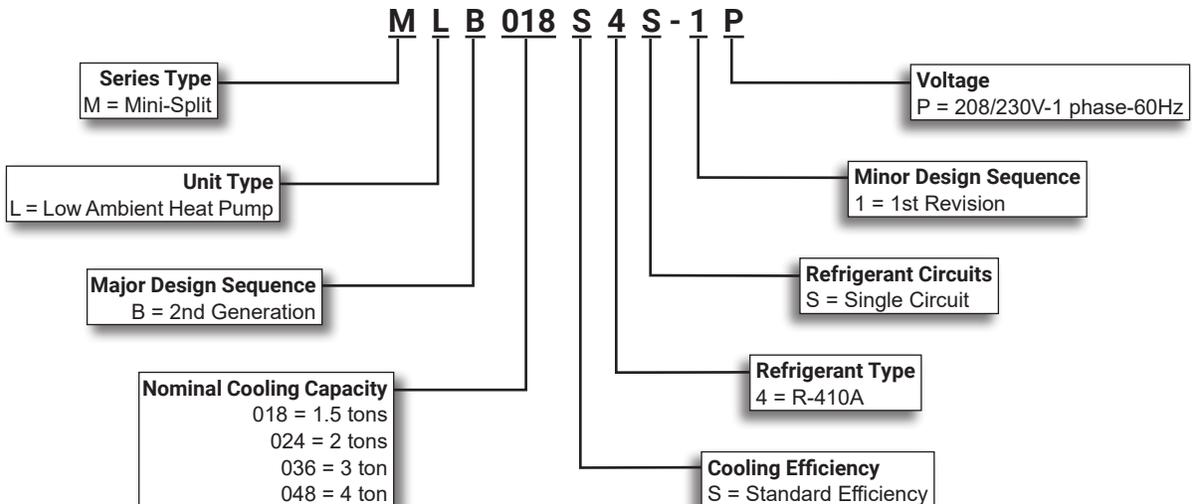
As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

### 6.1. Model Number Identification

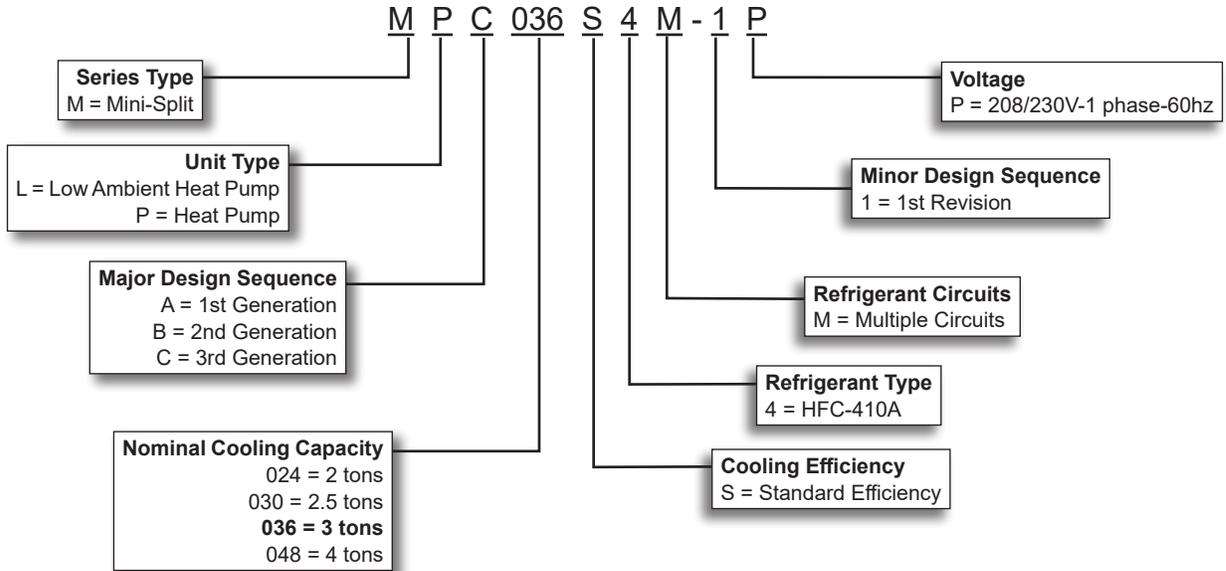
#### OUTDOOR SINGLE ZONE HEAT PUMP UNITS - MPC



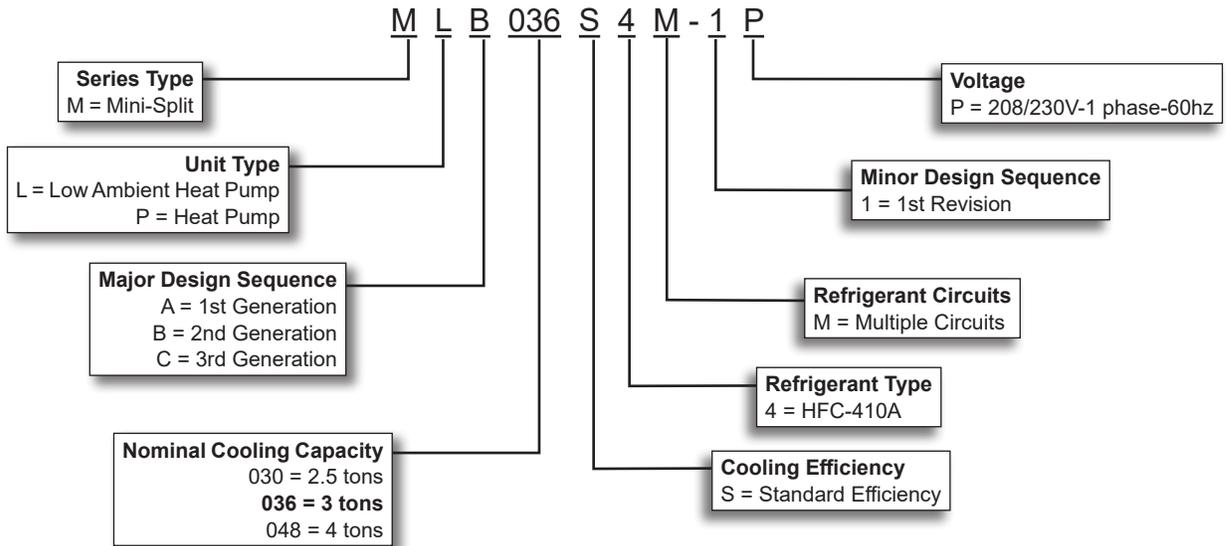
#### OUTDOOR SINGLE ZONE HEAT PUMP UNITS - MLB



**OUTDOOR MULTI-ZONE HEAT PUMP UNITS - MPC**



**OUTDOOR MULTI-ZONE HEAT PUMP UNITS - MLB**



## 6.2. Outdoor Unit Specifications

MLB SPECIFICATIONS		SINGLE ZONE   1.5 - 4 TON			
Outdoor Unit Model No.		MLB018S4S	MLB024S4S	MLB036S4S	MLB048S4S
Nominal Size - Tons		1.5	2	3	4
<b>Ambient Temperature Operating Range - °F</b>	Cooling	-22 - 122	-22 - 122	-22 - 122	-22 - 122
	Heating	-22 - 86	-22 - 86	-22 - 86	-22 - 86
<b>Sound Data (dBA)</b>	Cooling	59	62	63	65
	Heating	59	62	63	65
<b>Refrigerant</b>	Charge furnished (R-410A)	4 lbs. 1 oz.	5 lbs. 12 oz.	16 lbs. 0 oz.	16 lbs. 0 oz.
	Maximum line length with furnished charge - ft.	25	25	25	25
	Additional charge required per ft. - oz.	0.16	0.32	0.32	0.32
<b>Compressor</b>	No. and Type	(1) Rotary	(1) Rotary	Twin-Rotary	Twin-Rotary
	Refrigerant oil type	VG74	VG74	Ester Oil VG74	POE VG74
	Refrigerant oil charge - oz.	21	21	49.4	49.4
<b>Connections - in.</b>	Liquid/Gas pipe (flare)	1/4 / 1/2	3/8 / 5/8	3/8 / 5/8	3/8 / 5/8
	Maximum refrigerant pipe length - ft.	98	164	213	213
	Max. difference in level of indoor unit - ft.	66	82	98	98
<b>Outdoor Fan</b>	(No.) Diameter - in.	(1) 19	(1) 22	(2) 22	(2) 22
	Total air volume - cfm	1355	2355	4470	4470
	rpm	810/720/1150	1150/1050/900/850	900/850/800/750	900/850/800/750
<b>Outdoor Coil</b>	Number of rows	2	2	2	2
	Fins per inch	18	19	18	18
	Fin type	Hydrophilic aluminum			
	Tube outside diameter - in.	3/8	3/8	3/8	3/8
	Tube type	Rifled copper tubing			
	Net face area - ft. <sup>2</sup>	5.19	8.16	6.43+6.97	6.43+6.97
<b>Design Pressure</b>	PSIG	550/340	550/340	550/340	550/340
<b>Shipping Data</b>	Net/Shipping weight (lbs.)	101 / 108	135 / 145	220 / 248	227 / 256
ELECTRICAL DATA					
<b>Electrical Characteristics - 60 Hz - 1 Phase</b>		208/230V	208/230V	208/230V	208/230V
<sup>1</sup> Maximum Overcurrent Protection (MOCP) amps		25	35	50	50
<sup>2</sup> Minimum circuit ampacity (MCA)		16	25	41	42
<b>Outdoor Fan Motor</b>	Output - W	80	120	(2) 85	(2) 85

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

<sup>1</sup> HACR type circuit breaker or fuse.

<sup>2</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

**MLB SPECIFICATIONS**
**MULTI-ZONE | 2.5 & 3 TON**

Nominal Size - Tons		2.5	3
Outdoor Unit Model No.		MLB030S4M	MLB036S4M
Number of Zones		Up to 3	Up to 4
Ambient Temperature Range - °F	Cooling	-22 - 122	-22 - 122
	Heating	-22 - 86	-22 - 86
Sound Data (dBA)		63	63
Refrigerant	Charge furnished (R-410A)	8 lbs. 6 oz.	10 lbs. 2 oz.
Maximum line length with furnished charge (per zone) - ft.		74	98
Additional charge required per ft. - oz.		0.16	0.16
Compressor	No. and Type	(1) Rotary	(1) Rotary
	Refrigerant oil type	Ester Oil VG74	Ester Oil VG74
	Refrigerant oil charge - oz.	33.8	47.3
Connections - in.	Liquid+Gas pipe (flare)	(3) 1/4 liq. + (3) 3/8 gas	(3) 1/4 liq. + (3) 3/8 gas (1) 1/4 liq. + (1) 1/2 gas
	Maximum pipe length for all rooms - ft.	197	262
	Maximum pipe length for one indoor unit - ft.	98	115
	Max. height difference between indoor and outdoor units - ft.	49	49
	Max. height difference between indoor units - ft.	33	33
Outdoor Fan	(No.) Diameter - in.	(1) 22	(2) 22
	Total air volume - cfm	2150	4500
	rpm	1000 / 900 / 750	800 / 700 / 600
Outdoor Coil	Number of rows	2.6	2
	Fins per inch	16	18
	Fin type	Hydrophilic aluminum	
	Tube outside diameter - in.	3/8	3/8
	Tube type	Rifled copper tubing	
	Net face area - ft. <sup>2</sup>	8.16	6.54
Design Pressure	PSIG	540 / 340	540 / 340
Shipping Data	Net/Shipping weight (lbs.)	168 / 180	224 / 255

**ELECTRICAL DATA**

Electrical Characteristics - 60 Hz - 1 Phase		208/230V	208/230V
<sup>1</sup> Maximum Overcurrent Protection (MOCP) amps		40	50
<sup>2</sup> Minimum circuit ampacity (MCA)		25	35
Outdoor Fan Motor	Output - W	120	(2) 85

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

<sup>1</sup> HACR type circuit breaker or fuse.

<sup>2</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

NOTE - Adaptors are furnished for the gas pipe connections:

018 - (2) 3/8 x 1/2 in.

030 - (3) 3/8 x 1/2 in.

**MLB SPECIFICATIONS**
**MULTI-ZONE | 4 TON**

<b>Nominal Size - Tons</b>		<b>4</b>
<b>Outdoor Unit Model No.</b>		<b>MLB048S4M</b>
<b>Number of Zones</b>		<b>Up to 5</b>
<b>Ambient Temperature Range - °F</b>	Cooling	-22 - 122
	Heating	-22 - 86
<b>Sound Data (dBA)</b>		65
<b>Refrigerant</b>	Charge furnished (R-410A)	10 lbs. 3 oz.
	Maximum line length with furnished charge (per zone) - ft.	123
	Additional charge required per ft. - oz.	0.16 (1/4 in.) / 0.32 (3/8 in.)
<b>Compressor</b>	No. and Type	(1) Rotary
	Refrigerant oil type	Ester Oil VG74
	Refrigerant oil charge - oz.	49
<b>Connections - in.</b>	Liquid+Gas pipe (flare)	(5) 1/4 + (3) 3/8 + (2) 1/2
	Maximum pipe length for all rooms - ft.	262
	Maximum pipe length for one indoor unit - ft.	115
Max. height difference between indoor and outdoor units - ft.		49
	Max. height difference between indoor units - ft.	33
<b>Outdoor Fan</b>	(No.) Diameter - in.	(2) 22
	Total air volume - cfm	4500
	rpm	800/700/600
<b>Outdoor Coil</b>	Number of rows	2
	Fins per inch	18
	Fin type	Hydrophilic aluminum
	Tube outside diameter - in.	3/8
	Tube type	Rifled copper tubing
	Net face area - ft. <sup>2</sup>	6.43+6.97
<b>Design Pressure</b>	PSIG	550/340
<b>Shipping Data</b>	Net/Shipping weight (lbs.)	239 / 270

**ELECTRICAL DATA**

<b>Electrical Characteristics - 60 Hz - 1 Phase</b>		208/230V
	<sup>1</sup> Maximum Overcurrent Protection (MOCP) amps	50
	<sup>2</sup> Minimum circuit ampacity (MCA)	35
<b>Outdoor Fan Motors</b>	Output - W	(2) 85

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

<sup>1</sup> HACR type circuit breaker or fuse.

<sup>2</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

NOTE - Adaptors are furnished for the gas pipe connections:

036 - (3) 3/8 x 1/2 in. and (1) 1/2 x 3/8 in.

048 - (3) 3/8 x 1/2 in., (2) 1/2 x 3/8 in., (2) 1/4 x 3/8 in. and (2) 1/2 x 5/8 in.

**MPC SPECIFICATIONS**
**SINGLE ZONE | 1.5 - 4 TON**

Nominal Size - Tons		1.5	2	3	4
<b>Outdoor Unit Model No.</b>		<b>MPC018S4S</b>	<b>MPC024S4S</b>	<b>MPC036S4S</b>	<b>MPC048S4S</b>
<b>Ambient Temperature Operating Range - °F</b>	Cooling	-13 - 122	-13 - 122	-13 - 122	-13 - 122
	Heating	-13 - 86	-13 - 86	-13 - 86	-13 - 86
<b>Sound Data (dBA)</b>	Cooling/Heating	58	60	65	63.5
<b>Refrigerant (R-410A)</b>	Charge furnished	3 lbs. 8 oz.	5 lbs. 3 oz.	7 lbs. 1 oz.	9 lbs. 15 oz.
	Maximum line length with furnished charge - ft.	25	25	25	25
	Additional charge required per ft. - oz.	0.16	0.32	0.32	0.32
<b>Compressor</b>	No. and Type	(1) Rotary	(1) Rotary	(1) Rotary	(1) Rotary
	Refrigerant oil type	VG74	VG74	VG74	VG74
	Refrigerant oil charge - oz.	14.9	21.0	33.8	47.3
<b>Connections - in.</b>	Liquid/Gas pipe (flare)	1/4 / 1/2	3/8 / 5/8	3/8 / 5/8	3/8 / 5/8
	Maximum refrigerant pipe length - ft.	98	164	213	213
	Max. difference in level of indoor unit - ft.	66	82	98	98
<b>Outdoor Fan</b>	(No.) Diameter - in.	(1) 16-1/2	(1) 22	(1) 22	(2) 22
	Total air volume - cfm	1765	2235	2120	4500
	rpm	810	900	1050	900
<b>Outdoor Coil</b>	Number of rows	3	2.6	2	2
	Fins per inch	19	18	18	18
	Fin type	Hydrophilic aluminum			
	Tube outside diameter - in.	5/16	5/16	3/8	3/8
	Tube type	Rifled copper tubing			
	Net face area - ft. <sup>2</sup>	5.90	8.21	8.16	13.53
<b>Design Pressure</b>	PSIG	550 / 340	550 / 340	550 / 340	550 / 340
<b>Shipping Data</b>	Net/Shipping weight (lbs.)	95 / 102	125 / 135	155 / 166	219 / 249
<b>ELECTRICAL DATA</b>					
<b>Electrical Characteristics - 60 Hz - 1 Phase</b>		208/230V	208/230V	208/230V	208/230V
<sup>1</sup> Maximum Overcurrent Protection (MOCP) amps		25	30	45	50
<sup>2</sup> Minimum circuit ampacity (MCA)		17	22	30	36.5
<b>Outdoor Fan Motor</b>	Output - W	80	120	120	85

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

<sup>1</sup> HACR type circuit breaker or fuse.

<sup>2</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

**MPC SPECIFICATIONS**
**SINGLE ZONE | 5 TON**

<b>Nominal Size - Tons</b>		<b>5</b>
<b>Outdoor Unit Model No.</b>		<b>MPC060S4S</b>
<b>Ambient Temperature Operating Range - °F</b>	Cooling	60 - 90
	Heating	32 - 86
<b>Sound Data (dBA)</b>	Cooling/Heating Hi/Med/Low	50 / 47 / 45
<b>Refrigerant (R-410A)</b>	Charge furnished	10 lbs. 9 oz.
	Maximum line length with furnished charge - ft.	25
	Additional charge required per ft. - oz.	0.32
<b>Compressor</b>	No. and Type	(1) Rotary
	Refrigerant oil type	VG74
	Refrigerant oil charge - oz.	47.3
<b>Connections - in.</b>	Liquid/Gas pipe (flare)	3/8 / 7/8
	Maximum refrigerant pipe length - ft.	213
	Max. difference in level of indoor unit - ft.	98
<b>Outdoor Fan</b>	(No.) Diameter - in.	(2) 22
	Total air volume - cfm	4500
	rpm	900
<b>Outdoor Coil</b>	Number of rows	5
	Fins per inch	1.3
	Fin type	Hydrophilic aluminum
	Tube outside diameter - in.	3/8
	Tube type	Rifled copper tubing
	Net face area - ft. <sup>2</sup>	13.58
<b>Design Pressure</b>	PSIG	550 / 340
<b>Shipping Data</b>	Net/Shipping weight (lbs.)	164 / 190

**ELECTRICAL DATA**

<b>Electrical Characteristics - 60 Hz - 1 Phase</b>		208/230
<sup>1</sup> Maximum Overcurrent Protection (MOCP) amps		50
<sup>2</sup> Minimum circuit ampacity (MCA)		39
<b>Outdoor Fan Motor</b>	Output - W	85

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

<sup>1</sup> HACR type circuit breaker or fuse.

<sup>2</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

**MPC SPECIFICATIONS**
**MULTI-ZONE | 2 TON**

Nominal Size - Tons		2	2
Outdoor Unit Model No.		<b>MPC024S4M</b>	<b>MPC030S4M</b>
Number of Zones		<b>Up to 4</b>	<b>Up to 5</b>
Ambient Temperature Range - °F	Cooling	-13 - 122	-13 - 122
	Heating	-13 - 86	-13 - 86
Sound Data (dBA)	Cooling	63	64
	Heating	63	64
Refrigerant	Charge furnished (R-410A)	8 lbs. 6 oz.	10 lbs. 2 oz.
	Maximum line length with furnished charge (per zone) - ft.	98	123
	Additional charge required per ft. - oz.	0.16	0.16
Compressor	No. and Type	(1) Rotary	(1) Rotary
	Refrigerant oil type	VG74	VG74
	Refrigerant oil charge - oz.	33.80	47.30
Connections	Liquid+Gas+Gas pipe (in.) flare	(4) 1/4 + (3) 3/8 / (1) 1/2"	(5) 1/4 + (3) 3/8 / (2) 1/2"
	Max pipe. length for all rooms - ft.	262	262
	Max. pipe length for one indoor unit - ft.	115	115
	Max. height difference between indoor and outdoor units - ft.	49	49
	Max. height difference between indoor units - ft.	33	33
Outdoor Fan(s)	(No.) Diameter - in.	(1) 22	(2) 22
	Total air volume - cfm	2150	4500
	Motor rpm	1000/900/750	800/700/600
Outdoor Coil	Number of rows	2.6	2
	Fins per inch	16	18
	Fin type	Hydrophilic Aluminum	
	Tube outside diameter - in.	3/8	3/8
	Tube type	Rifled Copper Tubing	
	Net face area - ft. <sup>2</sup>	8.16	6.66+6.66
Design Pressure	PSIG	540 / 340	540 / 340
Shipping Data	Net/Shipping weight (lbs.)	169 / 181	224 / 255

**ELECTRICAL DATA**

<b>Electrical Characteristics - 60 Hz - 1 Phase</b>		208/230V	208/230V
	<sup>1</sup> Maximum Overcurrent Protection (MOCP) amps	40	50
	<sup>2</sup> Minimum circuit ampacity (MCA)	25	35
Outdoor Fan Motor	Output - W	120	(2) 85

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

<sup>1</sup> HACR type circuit breaker or fuse.

<sup>2</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

NOTE - Adaptors are furnished for the gas pipe connections:

036 - (3) 3/8 x 1/2 in. and (1) 1/2 x 3/8 in.

048 - (3) 3/8 x 1/2 in., (2) 1/2 x 3/8 in., (2) 1/4 x 3/8 in. and (2) 1/2 x 5/8 in.

**MPC SPECIFICATIONS**
**MULTI-ZONE | 3 & 4 TON**

Nominal Size - Tons		3	4
Outdoor Unit Model No.		<b>MPC036S4M</b>	<b>MPC048S4M</b>
Number of Zones		<b>Up to 4</b>	<b>Up to 5</b>
Ambient Temperature Range - °F	Cooling	-13 - 122	-13 - 122
	Heating	-13 - 86	-13 - 86
Sound Data (dBA)	Cooling	63	64
	Heating	63	64
Refrigerant	Charge furnished (R-410A)	8 lbs. 6 oz.	10 lbs. 2 oz.
	Maximum line length with furnished charge (per zone) - ft.	98	123
	Additional charge required per ft. - oz.	0.16	0.16
Compressor	No. and Type	(1) Rotary	(1) Rotary
	Refrigerant oil type	VG74	VG74
	Refrigerant oil charge - oz.	33.80	47.30
Connections	Liquid+Gas+Gas pipe (in.) flare	(4) 1/4 + (3) 3/8 / (1) 1/2"	(5) 1/4 + (3) 3/8 / (2) 1/2"
	Max pipe. length for all rooms - ft.	262	262
	Max. pipe length for one indoor unit - ft.	115	115
	Max. height difference between indoor and outdoor units - ft.	49	49
	Max. height difference between indoor units - ft.	33	33
Outdoor Fan(s)	(No.) Diameter - in.	(1) 22	(2) 22
	Total air volume - cfm	2150	4500
	Motor rpm	1000/900/750	800/700/600
Outdoor Coil	Number of rows	2.6	2
	Fins per inch	16	18
	Fin type	Hydrophilic Aluminum	
	Tube outside diameter - in.	3/8	3/8
	Tube type	Rifled Copper Tubing	
	Net face area - ft. <sup>2</sup>	8.16	6.66+6.66
Design Pressure	PSIG	540 / 340	540 / 340
Shipping Data	Net/Shipping weight (lbs.)	169 / 181	224 / 255

**ELECTRICAL DATA**

<b>Electrical Characteristics - 60 Hz - 1 Phase</b>		208/230V	208/230V
	<sup>1</sup> Maximum Overcurrent Protection (MOCP) amps	40	50
	<sup>2</sup> Minimum circuit ampacity (MCA)	25	35
Outdoor Fan Motor	Output - W	120	(2) 85

NOTE - Extremes of operating range are plus and minus 10% of line voltage.

<sup>1</sup> HACR type circuit breaker or fuse.

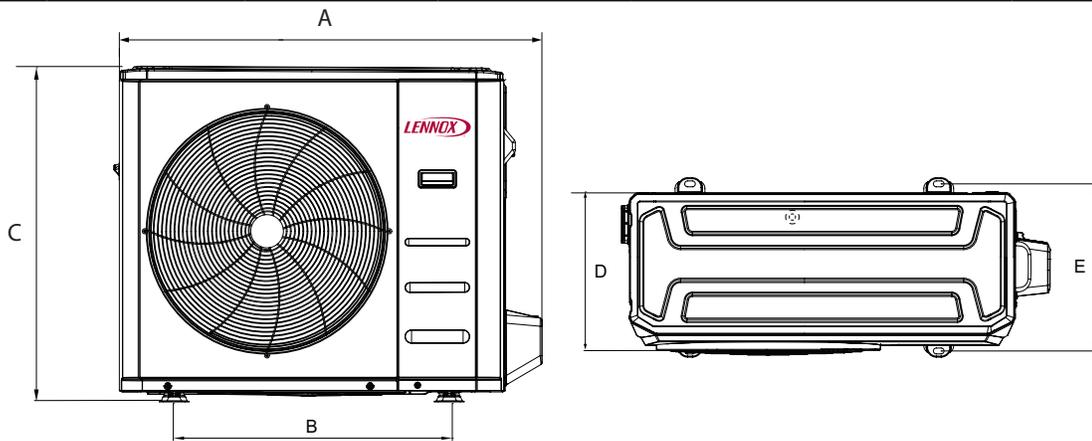
<sup>2</sup> Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

NOTE - Adaptors are furnished for the gas pipe connections:

036 - (3) 3/8 x 1/2 in. and (1) 1/2 x 3/8 in.

048 - (3) 3/8 x 1/2 in., (2) 1/2 x 3/8 in., (2) 1/4 x 3/8 in. and (2) 1/2 x 5/8 in.

### 6.3. Single-Zone Outdoor Unit Dimensions



TYPICAL APPEARANCE OF UNITS

**Figure 17. Single Zone Outdoor Unit Dimensions - Inches (mm)**

Model	Unit of Measurement	A	B	C	D	E
MPC018S4S-*P	inches	37-5/8	26-1/8	26-1/2	12-3/4	15
	mm	955	664	673	324	381
MPC024S4S-*P MPC036S4S-*P	inches	37-1/4	26-1/2	37-7/8	15-7/8	18
	mm	946	673	810	403	457
MPC048S4S-*P	inches	41-1/8	27-7/8	55-1/2	16-3/8	15-7/8
	mm	1045	708	1410	416	448
MPC060S4S-*P	inches	37-1/2	26	52-1/2	16-3/10	18-3/5
	mm	952	660	1334	414	472
MLB018S4S-*P	inches	40-3/4	26-1/2	31-7/8	16-1/8	15-7/8
	mm	1035	673	810	410	402
MLB024S4S-*P	inches	40-1/2	26-1/2	31-7/8	16-1/8	15-7/8
	mm	1029	673	810	410	410
MLB036S4S-P	inches	41-1/8	37-1/2	55-1/2	16-3/8	15-7/8
	mm	1045	953	1333	416	403
MLB048S4S-P	inches	41-1/8	37-1/2	55-1/2	16-3/8	15-7/8
	mm	1045	953	1333	416	403

## 6.4. Multi-Zone Outdoor Unit Dimensions

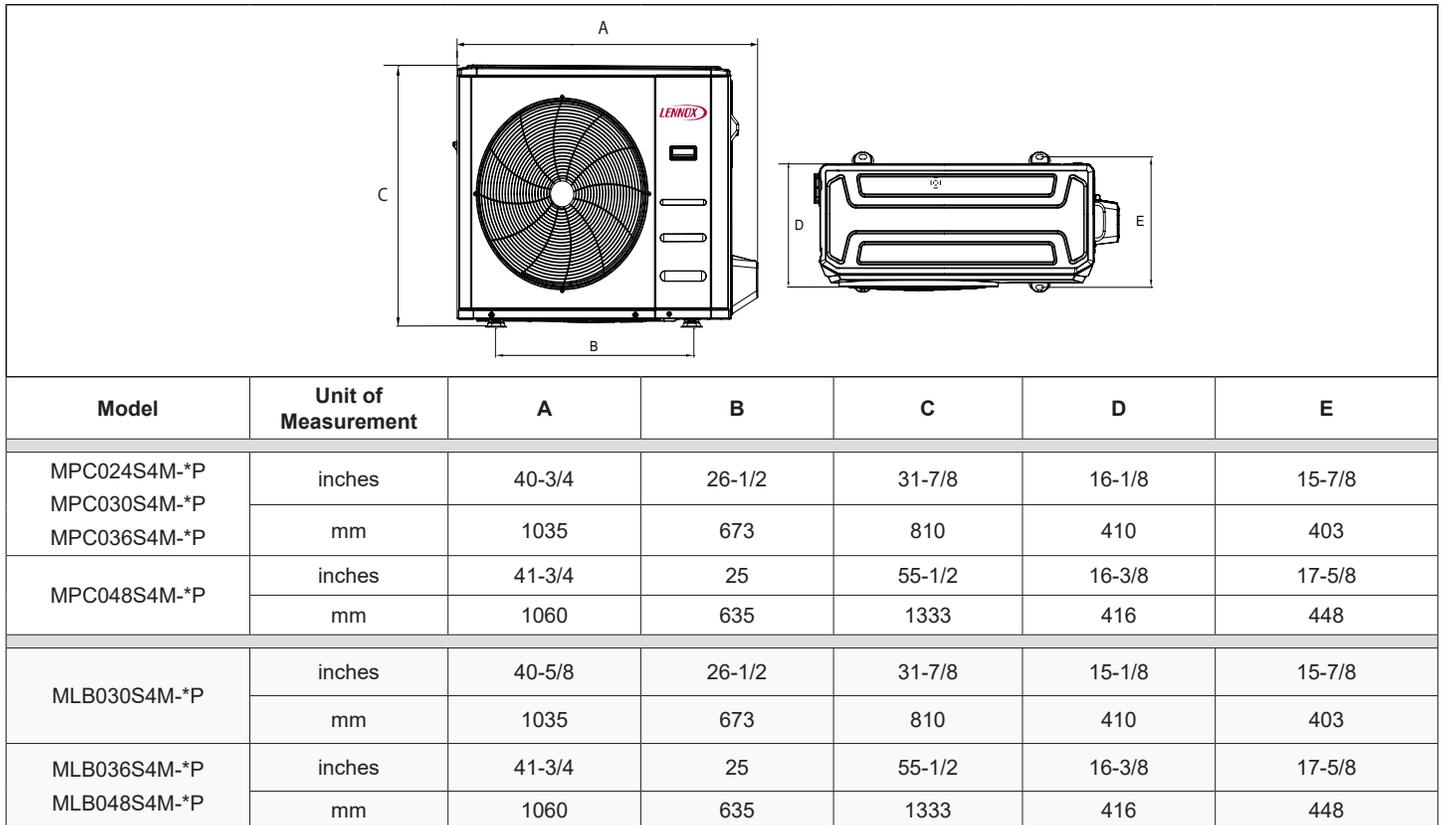
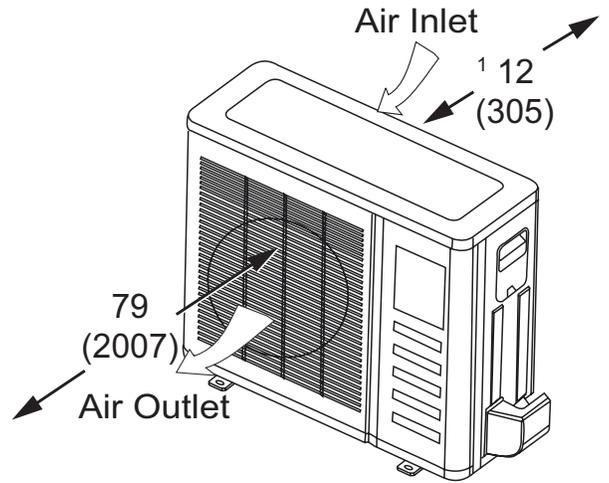
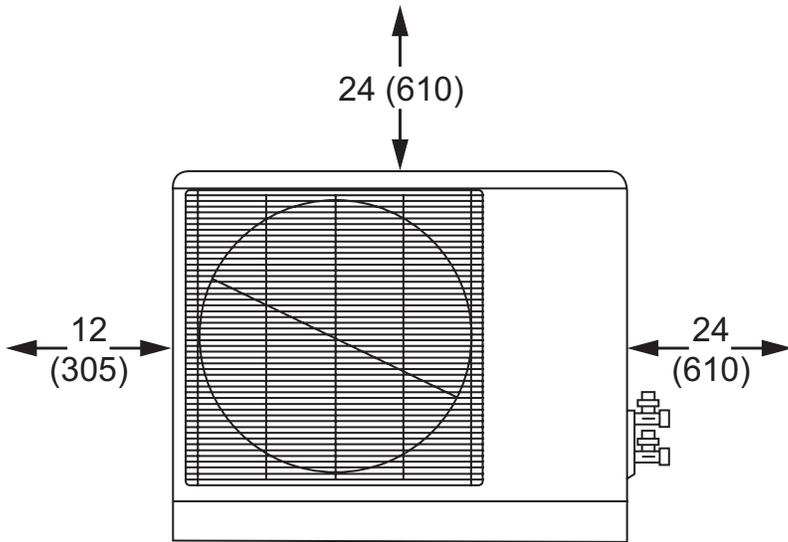
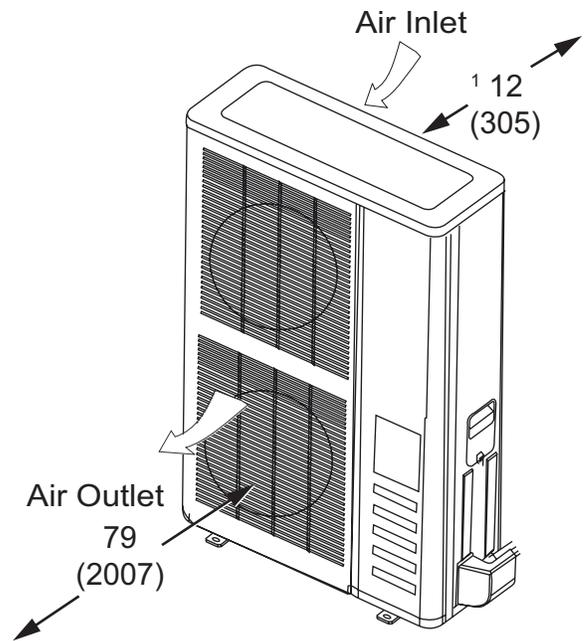
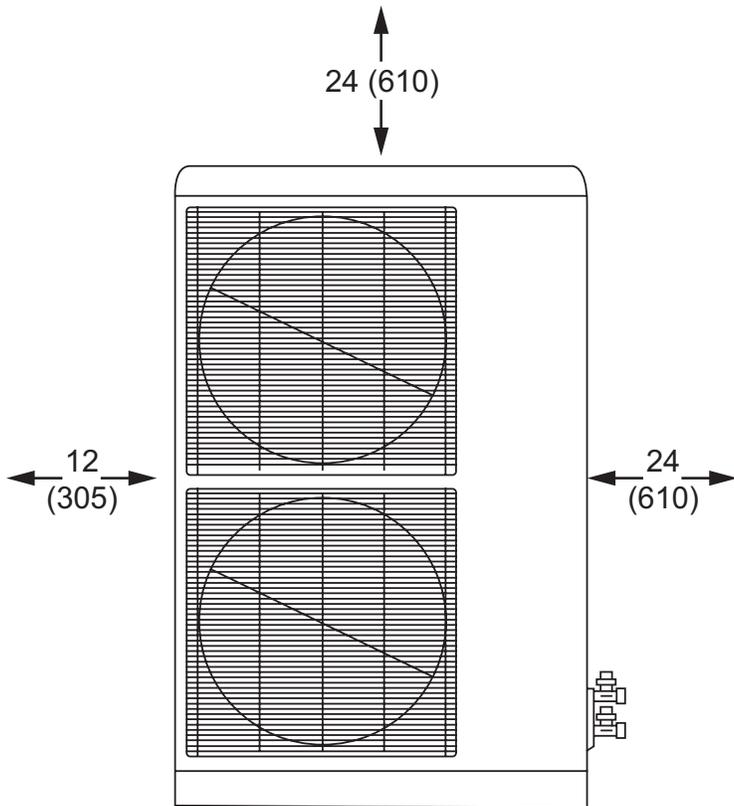


Figure 18. Multi-Zone Outdoor Unit Dimensions - Inches (mm)

## 6.5. Outdoor Unit Clearances - Single Units

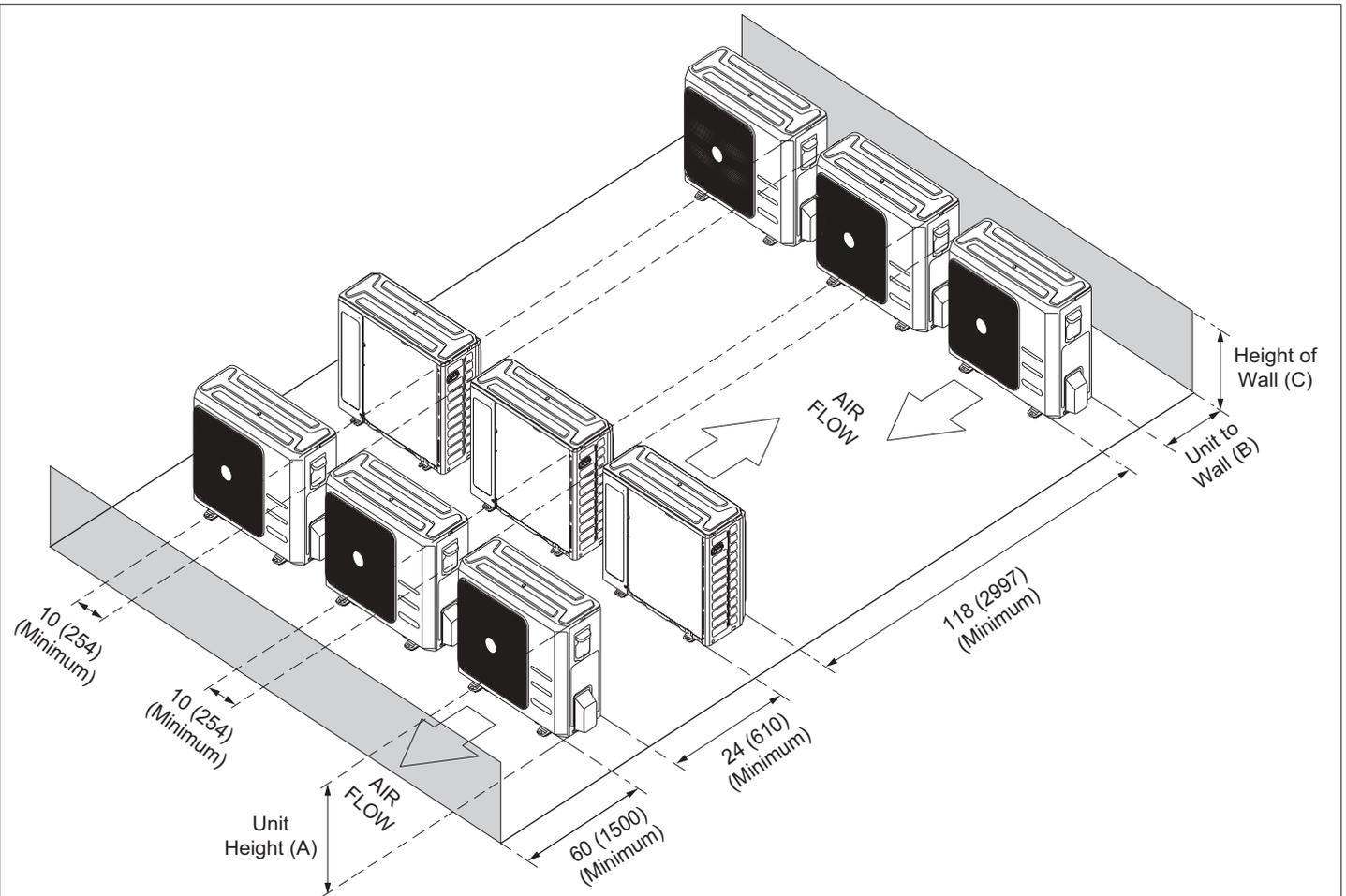


<sup>1</sup> Minimum rear clearance can be 6 inches (152 mm) when mounted on brackets and with no obstructions on the other three sides.



<sup>1</sup> Minimum rear clearance can be 6 inches (152 mm) when mounted on brackets and with no obstructions on the other three sides.

## 6.6. Outdoor Unit Clearances - Multiple Units



### CLEARANCE NOTES FOR MULTIPLE UNITS:

If the height of the wall (C) is less than or equal to the height of the smallest unit (A), the distance from the unit to the wall (B) must be a minimum of 10 inches (254 mm).

If 1/2 the height of the unit (A) is less than the height of the wall (C), the distance from the unit to the wall (B) must be a minimum of 12 inches (305 mm).

If the height of the wall (C) is greater than the height of the unit (A), the distance from the unit to the wall (B) must be a minimum of 20 inches (508 mm).

**Figure 19. Multiple Outdoor Unit Clearances - Inches (mm)**

## 7. MLB and MPC Multi-Zone System Combinations

**Table 5. MLB and MPC Multi-Zone System Combinations**

**NOTE - For multi-zone systems, the total capacity of all indoor units must be 66% to 133% of the outdoor unit capacity.**

Outdoor Unit Model No.	Number of Zones	Indoor Unit Capacity					Nominal Cooling Capacity at Rated System Capacity (Btuh)					Nominal Heating Capacity at Rated System Capacity (Btuh)					
		#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	
MPC024S4M	1	18K	---	---	---	---	16,000	---	---	---	---	17,000	---	---	---	---	
		24K	---	---	---	---	21,000	---	---	---	---	22,000	---	---	---	---	
	2	12K	6K	---	---	---	12,000	6,000	---	---	---	12,900	6,500	---	---	---	
		18K	6K	---	---	---	17,000	5,000	---	---	---	18,900	6,300	---	---	---	
		9K	9K	---	---	---	9,000	9,000	---	---	---	9,700	9,700	---	---	---	
		12K	9K	---	---	---	11,000	8,000	---	---	---	12,900	9,700	---	---	---	
		18K	9K	---	---	---	16,000	8,000	---	---	---	18,300	9,200	---	---	---	
		12K	12K	---	---	---	11,000	11,000	---	---	---	12,600	12,600	---	---	---	
		18K	12K	---	---	---	15,000	10,000	---	---	---	17,400	11,600	---	---	---	
		18K	18K	---	---	---	14,000	14,000	---	---	---	14,800	14,800	---	---	---	
	3	6K	6K	6K	---	---	7,000	7,000	7,000	---	---	8,500	8,500	8,500	---	---	
		9K	6K	6K	---	---	10,000	7,000	7,000	---	---	11,500	7,700	7,700	---	---	
		12K	6K	6K	---	---	13,000	6,000	6,000	---	---	13,900	7,000	7,000	---	---	
		18K	6K	6K	---	---	17,000	6,000	6,000	---	---	17,500	5,900	5,900	---	---	
		9K	9K	6K	---	---	9,000	9,000	6,000	---	---	9,500	9,500	6,000	---	---	
		12K	9K	6K	---	---	12,000	9,000	6,000	---	---	12,700	9,500	6,400	---	---	
		18K	9K	6K	---	---	16,000	8,000	5,000	---	---	16,100	8,100	5,400	---	---	
		12K	12K	6K	---	---	11,000	11,000	6,000	---	---	11,700	11,700	5,900	---	---	
		18K	12K	6K	---	---	15,000	10,000	5,000	---	---	15,000	10,000	5,000	---	---	
		9K	9K	9K	---	---	9,000	9,000	9,000	---	---	9,500	9,500	9,500	---	---	
		12K	9K	9K	---	---	11,000	9,000	9,000	---	---	11,700	8,800	8,800	---	---	
		18K	9K	9K	---	---	15,000	7,000	7,000	---	---	15,000	7,500	7,500	---	---	
	MLB030S4M MPC030S4M	1	18K	---	---	---	---	16,600	---	---	---	---	18,000	---	---	---	---
			24K	---	---	---	---	22,000	---	---	---	---	23,000	---	---	---	---
		2	12K	6K	---	---	---	12,000	6,000	---	---	---	12,900	6,500	---	---	---
			18K	6K	---	---	---	17,000	5,000	---	---	---	18,900	6,300	---	---	---
			9K	9K	---	---	---	9,000	9,000	---	---	---	9,700	9,700	---	---	---
			12K	9K	---	---	---	11,000	8,000	---	---	---	12,900	9,700	---	---	---
			18K	9K	---	---	---	16,000	8,000	---	---	---	18,300	9,200	---	---	---
			12K	12K	---	---	---	11,000	11,000	---	---	---	12,600	12,600	---	---	---
18K			12K	---	---	---	15,000	10,000	---	---	---	17,400	11,600	---	---	---	
18K			18K	---	---	---	14,000	14,000	---	---	---	14,800	14,800	---	---	---	
3		6K	6K	6K	---	---	7,000	7,000	7,000	---	---	8,500	8,500	8,500	---	---	
		9K	6K	6K	---	---	10,000	7,000	7,000	---	---	11,500	7,700	7,700	---	---	
	12K	6K	6K	---	---	13,000	6,000	6,000	---	---	13,900	7,000	7,000	---	---		
	18K	6K	6K	---	---	17,000	6,000	6,000	---	---	17,500	5,900	5,900	---	---		
	9K	9K	6K	---	---	10,000	10,000	6,000	---	---	10,500	10,500	7,000	---	---		
	12K	9K	6K	---	---	12,000	9,000	6,000	---	---	12,700	9,500	6,400	---	---		
	18K	9K	6K	---	---	16,000	8,000	5,000	---	---	16,100	8,100	5,400	---	---		
	12K	12K	6K	---	---	11,000	11,000	6,000	---	---	11,700	11,700	5,900	---	---		
	18K	12K	6K	---	---	15,000	10,000	5,000	---	---	15,000	10,000	5,000	---	---		
	9K	9K	9K	---	---	9,000	9,000	9,000	---	---	9,500	9,500	9,500	---	---		
	12K	9K	9K	---	---	11,000	9,000	9,000	---	---	11,700	8,800	8,800	---	---		
	18K	9K	9K	---	---	15,000	7,000	7,000	---	---	15,000	7,500	7,500	---	---		
12K	12K	9K	---	---	11,000	11,000	8,000	---	---	10,800	10,800	8,100	---	---			
12K	12K	12K	---	---	10,000	10,000	10,000	---	---	10,000	10,000	10,000	---	---			

<sup>1</sup> One outdoor unit may be matched with one indoor unit for single zone applications. Additional indoor units can be added at a later date for multi-zone applications (if applicable).

**NOTE - For multi-zone systems, the total capacity of all indoor units must be 66% to 133% of the outdoor unit capacity.**

Outdoor Unit Model No.	Number of Zones	Indoor Unit Capacity					Nominal Cooling Capacity at Rated System Capacity (Btuh)					Nominal Heating Capacity at Rated System Capacity (Btuh)				
		#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5
MLB036S4M MPC036S4M	1	24K	---	---	---	---	22,000	---	---	---	---	23,000	---	---	---	---
		30K	---	---	---	---	26,000	---	---	---	---	27,000	---	---	---	---
	2	18K	6K	---	---	---	18,000	6,000	---	---	---	19,100	6,400	---	---	---
		24K	6K	---	---	---	22,000	6,000	---	---	---	24,200	6,100	---	---	---
		18K	9K	---	---	---	17,000	9,000	---	---	---	18,700	9,400	---	---	---
		24K	9K	---	---	---	21,000	8,000	---	---	---	23,300	8,800	---	---	---
		12K	12K	---	---	---	12,000	12,000	---	---	---	12,800	12,800	---	---	---
		18K	12K	---	---	---	17,000	11,000	---	---	---	18,200	12,100	---	---	---
		24K	12K	---	---	---	20,000	10,000	---	---	---	22,200	11,100	---	---	---
		18K	18K	---	---	---	15,000	15,000	---	---	---	16,600	16,600	---	---	---
		24K	18K	---	---	---	18,000	13,000	---	---	---	19,300	14,500	---	---	---
		24K	24K	---	---	---	15,000	15,000	---	---	---	15,700	15,700	---	---	---
	3	12K	6K	6K	---	---	12,900	6,500	6,500	---	---	13,600	6,800	6,800	---	---
		18K	6K	6K	---	---	18,000	6,000	6,000	---	---	18,900	6,300	6,300	---	---
		24K	6K	6K	---	---	22,000	5,500	5,500	---	---	23,200	5,800	5,800	---	---
		12K	9K	6K	---	---	12,500	9,300	6,200	---	---	13,100	9,800	6,600	---	---
		18K	9K	6K	---	---	17,200	8,600	5,700	---	---	18,100	9,100	6,100	---	---
		24K	9K	6K	---	---	21,100	7,900	5,300	---	---	22,200	8,400	5,600	---	---
		12K	12K	6K	---	---	12,000	12,000	6,000	---	---	12,600	12,600	6,300	---	---
		18K	12K	6K	---	---	16,500	11,000	5,500	---	---	17,400	11,600	5,800	---	---
		24K	12K	6K	---	---	20,100	10,000	5,000	---	---	21,200	10,600	5,300	---	---
		18K	18K	6K	---	---	15,100	15,100	5,000	---	---	15,900	15,900	5,300	---	---
		24K	18K	6K	---	---	18,100	13,600	4,500	---	---	19,200	14,400	4,800	---	---
		9K	9K	9K	---	---	9,300	9,300	9,300	---	---	9,800	9,800	9,800	---	---
		12K	9K	9K	---	---	12,000	9,000	9,000	---	---	12,600	9,500	9,500	---	---
		18K	9K	9K	---	---	16,500	8,300	8,300	---	---	17,400	8,700	8,700	---	---
		24K	9K	9K	---	---	20,100	7,500	7,500	---	---	21,200	8,000	8,000	---	---
		12K	12K	9K	---	---	11,500	11,500	8,600	---	---	12,100	12,100	9,100	---	---
		18K	12K	9K	---	---	15,800	10,500	7,900	---	---	16,700	11,100	8,400	---	---
		24K	12K	9K	---	---	19,100	9,600	7,200	---	---	20,200	10,100	7,600	---	---
		18K	18K	9K	---	---	14,300	14,300	7,200	---	---	15,200	15,200	7,600	---	---
		12K	12K	12K	---	---	11,000	11,000	11,000	---	---	11,600	11,600	11,600	---	---
	18K	12K	12K	---	---	15,100	10,000	10,000	---	---	15,900	10,600	10,600	---	---	
	24K	12K	12K	---	---	18,100	9,100	9,100	---	---	19,200	9,600	9,600	---	---	
	18K	18K	12K	---	---	13,600	13,600	9,100	---	---	14,400	14,400	9,600	---	---	
	4	6K	6K	6K	6K	---	7,200	7,200	7,200	7,200	---	7,700	7,700	7,700	7,700	---
		9K	6K	6K	6K	---	10,400	6,900	6,900	6,900	---	11,000	7,400	7,400	7,400	---
		12K	6K	6K	6K	---	13,200	6,600	6,600	6,600	---	14,000	7,000	7,000	7,000	---
		18K	6K	6K	6K	---	17,900	6,000	6,000	6,000	---	19,000	6,400	6,400	6,400	---
		24K	6K	6K	6K	---	21,400	5,300	5,300	5,300	---	22,600	5,700	5,700	5,700	---
		9K	9K	6K	6K	---	9,900	9,900	6,600	6,600	---	10,500	10,500	7,000	7,000	---
		12K	9K	6K	6K	---	12,600	9,400	6,300	6,300	---	13,300	10,000	6,700	6,700	---
		18K	9K	6K	6K	---	17,000	8,500	5,700	5,700	---	18,000	9,000	6,000	6,000	---
		24K	9K	6K	6K	---	20,100	7,500	5,000	5,000	---	21,200	8,000	5,300	5,300	---
		12K	12K	6K	6K	---	12,000	12,000	6,000	6,000	---	12,700	12,700	6,400	6,400	---
		18K	12K	6K	6K	---	16,000	10,700	5,300	5,300	---	17,000	11,300	5,700	5,700	---
		24K	12K	6K	6K	---	18,900	9,400	4,700	4,700	---	19,900	10,000	5,000	5,000	---
		9K	9K	9K	6K	---	9,400	9,400	9,400	6,300	---	10,000	10,000	10,000	6,700	---
		12K	9K	9K	6K	---	12,000	9,000	9,000	6,000	---	12,700	9,500	9,500	6,400	---
		18K	9K	9K	6K	---	16,000	8,000	8,000	5,300	---	17,000	8,500	8,500	5,700	---
24K		9K	9K	6K	---	18,900	7,100	7,100	4,700	---	19,900	7,500	7,500	5,000	---	
12K		12K	9K	6K	---	11,300	11,300	8,500	5,700	---	12,000	12,000	9,000	6,000	---	
18K		12K	9K	6K	---	15,100	10,100	7,500	5,000	---	15,900	10,600	8,000	5,300	---	
12K		12K	12K	6K	---	10,700	10,700	10,700	5,300	---	11,300	11,300	11,300	5,700	---	
18K		12K	12K	6K	---	14,100	9,400	9,400	4,700	---	14,900	10,000	10,000	5,000	---	
9K		9K	9K	9K	---	9,000	9,000	9,000	9,000	---	9,500	9,500	9,500	9,500	---	
12K		9K	9K	9K	---	11,300	8,500	8,500	8,500	---	12,000	9,000	9,000	9,000	---	
18K		9K	9K	9K	---	15,100	7,500	7,500	7,500	---	15,900	8,000	8,000	8,000	---	
12K		12K	9K	9K	---	10,700	10,700	8,000	8,000	---	11,300	11,300	8,500	8,500	---	
18K	12K	9K	9K	---	14,100	9,400	7,100	7,100	---	14,900	10,000	7,500	7,500	---		
12K	12K	12K	9K	---	10,100	10,100	10,100	7,500	---	10,600	10,600	10,600	8,000	---		
12K	12K	12K	12K	---	9,400	9,400	9,400	9,400	---	10,000	10,000	10,000	10,000	---		

<sup>1</sup> One outdoor unit may be matched with one indoor unit for single zone applications. Additional indoor units can be added at a later date for multi-zone applications (if applicable).

**NOTE - For multi-zone systems, the total capacity of all indoor units must be 66% to 133% of the outdoor unit capacity.**

Outdoor Unit Model No.	Number of Zones	Indoor Unit Capacity					Nominal Cooling Capacity at Rated System Capacity (Btuh)					Nominal Heating Capacity at Rated System Capacity (Btuh)				
		#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5
MLB048S4M MPC048S4M	1	30K	---	---	---	---	27,000	---	---	---	---	28,000	---	---	---	---
		36K	---	---	---	---	33,000	---	---	---	---	34,000	---	---	---	---
	2	24K	9K	---	---	---	24,000	9,000	---	---	---	25,100	9,400	---	---	---
		30K	9K	---	---	---	29,000	8,000	---	---	---	30,400	9,100	---	---	---
		24K	12K	---	---	---	23,000	11,000	---	---	---	24,800	12,400	---	---	---
		30K	12K	---	---	---	28,000	11,000	---	---	---	29,600	11,900	---	---	---
		18K	18K	---	---	---	17,000	17,000	---	---	---	18,600	18,600	---	---	---
		24K	18K	---	---	---	22,000	17,000	---	---	---	23,700	17,800	---	---	---
		30K	18K	---	---	---	26,000	15,000	---	---	---	27,600	16,600	---	---	---
		24K	24K	---	---	---	21,000	21,000	---	---	---	22,000	22,000	---	---	---
		30K	24K	---	---	---	23,000	18,000	---	---	---	25,000	20,000	---	---	---
		30K	30K	---	---	---	19,000	19,000	---	---	---	21,700	21,700	---	---	---
	3	24K	6K	6K	---	---	24,000	6,000	6,000	---	---	25,500	6,400	6,400	---	---
		30K	6K	6K	---	---	29,000	6,000	6,000	---	---	30,100	6,100	6,100	---	---
		24K	9K	6K	---	---	23,000	9,000	6,000	---	---	24,800	9,300	6,200	---	---
		30K	9K	6K	---	---	28,000	8,000	6,000	---	---	29,300	8,800	5,900	---	---
		18K	12K	6K	---	---	18,000	12,000	6,000	---	---	19,100	12,800	6,400	---	---
		24K	12K	6K	---	---	23,000	11,000	6,000	---	---	24,100	12,100	6,100	---	---
		30K	12K	6K	---	---	27,000	11,000	5,000	---	---	28,600	11,500	5,800	---	---
		18K	18K	6K	---	---	17,000	17,000	6,000	---	---	18,100	18,100	6,100	---	---
		24K	18K	6K	---	---	22,000	16,000	5,000	---	---	22,900	17,200	5,800	---	---
		30K	18K	6K	---	---	26,000	15,000	5,000	---	---	27,300	16,400	5,500	---	---
		24K	24K	6K	---	---	20,000	20,000	5,000	---	---	21,800	21,800	5,500	---	---
		30K	24K	6K	---	---	24,000	19,000	5,000	---	---	26,200	21,000	5,300	---	---
		18K	9K	9K	---	---	18,000	9,000	9,000	---	---	19,100	9,600	9,600	---	---
		24K	9K	9K	---	---	23,000	9,000	9,000	---	---	24,100	9,100	9,100	---	---
		30K	9K	9K	---	---	27,000	8,000	8,000	---	---	28,600	8,600	8,600	---	---
		12K	12K	9K	---	---	12,000	12,000	9,000	---	---	13,200	13,200	9,900	---	---
		18K	12K	9K	---	---	18,000	12,000	9,000	---	---	18,600	12,400	9,300	---	---
		24K	12K	9K	---	---	22,000	11,000	8,000	---	---	23,500	11,800	8,800	---	---
		30K	12K	9K	---	---	26,000	11,000	8,000	---	---	27,900	11,200	8,400	---	---
		18K	18K	9K	---	---	17,000	17,000	8,000	---	---	17,600	17,600	8,800	---	---
		24K	18K	9K	---	---	21,000	16,000	8,000	---	---	22,300	16,800	8,400	---	---
		30K	18K	9K	---	---	25,000	15,000	7,000	---	---	26,700	16,100	8,100	---	---
		24K	24K	9K	---	---	20,000	20,000	7,000	---	---	21,400	21,400	8,100	---	---
		30K	24K	9K	---	---	23,000	19,000	7,000	---	---	25,700	20,600	7,800	---	---
		12K	12K	12K	---	---	12,000	12,000	12,000	---	---	12,800	12,800	12,800	---	---
		18K	12K	12K	---	---	17,000	11,000	11,000	---	---	18,100	12,100	12,100	---	---
		24K	12K	12K	---	---	22,000	11,000	11,000	---	---	22,900	11,500	11,500	---	---
		30K	12K	12K	---	---	26,000	10,000	10,000	---	---	27,300	10,900	10,900	---	---
		18K	18K	12K	---	---	16,000	16,000	11,000	---	---	17,200	17,200	11,500	---	---
		24K	18K	12K	---	---	20,000	15,000	10,000	---	---	21,800	16,400	10,900	---	---
30K	18K	12K	---	---	24,000	14,000	10,000	---	---	26,200	15,700	10,500	---	---		
24K	24K	12K	---	---	19,000	19,000	10,000	---	---	21,000	21,000	10,500	---	---		
18K	18K	18K	---	---	15,000	15,000	15,000	---	---	16,400	16,400	16,400	---	---		
24K	18K	18K	---	---	19,000	14,000	14,000	---	---	21,000	15,700	15,700	---	---		

<sup>1</sup> One outdoor unit may be matched with one indoor unit for single zone applications. Additional indoor units can be added at a later date for multi-zone applications (if applicable).

**NOTE - For multi-zone systems, the total capacity of all indoor units must be 66% to 133% of the outdoor unit capacity.**

Outdoor Unit Model No.	Number of Zones	Indoor Unit Capacity					Nominal Cooling Capacity at Rated System Capacity (Btuh)					Nominal Heating Capacity at Rated System Capacity (Btuh)				
		#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5
MLB048S4M MPC048S4M	4	18K	6K	6K	6K	---	18,000	6,000	6,000	6,000	---	---	19,400	6,500	6,500	6,500
		24K	6K	6K	6K	---	24,000	6,000	6,000	6,000	---	---	25,100	6,300	6,300	6,300
		30K	6K	6K	6K	---	29,000	6,000	6,000	6,000	---	---	30,100	6,100	6,100	6,100
		18K	9K	6K	6K	---	18,000	9,000	6,000	6,000	---	---	19,100	9,600	6,400	6,400
		24K	9K	6K	6K	---	24,000	9,000	6,000	6,000	---	---	24,600	9,300	6,200	6,200
		30K	9K	6K	6K	---	28,000	8,000	6,000	6,000	---	---	29,200	8,800	5,900	5,900
		12K	12K	6K	6K	---	12,000	12,000	6,000	6,000	---	---	12,900	12,900	6,500	6,500
		18K	12K	6K	6K	---	18,000	12,000	6,000	6,000	---	---	18,900	12,600	6,300	6,300
		24K	12K	6K	6K	---	23,000	11,000	6,000	6,000	---	---	24,100	12,100	6,100	6,100
		30K	12K	6K	6K	---	27,000	11,000	5,000	5,000	---	---	28,200	11,300	5,700	5,700
		18K	18K	6K	6K	---	17,000	17,000	6,000	6,000	---	---	18,100	18,100	6,100	6,100
		24K	18K	6K	6K	---	22,000	16,000	5,000	5,000	---	---	22,600	16,900	5,700	5,700
		30K	18K	6K	6K	---	25,000	15,000	5,000	5,000	---	---	25,800	15,500	5,200	5,200
		24K	24K	6K	6K	---	20,000	20,000	5,000	5,000	---	---	20,700	20,700	5,200	5,200
		12K	9K	9K	6K	---	12,000	9,000	9,000	6,000	---	---	12,900	9,700	9,700	6,500
		18K	9K	9K	6K	---	18,000	9,000	9,000	6,000	---	---	18,900	9,500	9,500	6,300
		24K	9K	9K	6K	---	23,000	9,000	9,000	6,000	---	---	24,100	9,100	9,100	6,100
		30K	9K	9K	6K	---	27,000	8,000	8,000	5,000	---	---	28,200	8,500	8,500	5,700
		12K	12K	9K	6K	---	12,000	12,000	9,000	6,000	---	---	12,800	12,800	9,600	6,400
		18K	12K	9K	6K	---	18,000	12,000	9,000	6,000	---	---	18,500	12,300	9,300	6,200
		24K	12K	9K	6K	---	22,000	11,000	8,000	6,000	---	---	23,400	11,700	8,800	5,900
		30K	12K	9K	6K	---	26,000	10,000	8,000	5,000	---	---	27,100	10,900	8,200	5,500
		18K	18K	9K	6K	---	17,000	17,000	8,000	6,000	---	---	17,500	17,500	8,800	5,900
		24K	18K	9K	6K	---	21,000	16,000	8,000	5,000	---	---	21,700	16,300	8,200	5,500
		30K	18K	9K	6K	---	24,000	14,000	7,000	5,000	---	---	24,500	14,700	7,400	4,900
		12K	12K	12K	6K	---	12,000	12,000	12,000	6,000	---	---	12,600	12,600	12,600	6,300
		18K	12K	12K	6K	---	17,000	11,000	11,000	6,000	---	---	18,100	12,100	12,100	6,100
		24K	12K	12K	6K	---	22,000	11,000	11,000	5,000	---	---	22,600	11,300	11,300	5,700
		30K	12K	12K	6K	---	25,000	10,000	10,000	5,000	---	---	25,800	10,400	10,400	5,200
		18K	18K	12K	6K	---	16,000	16,000	11,000	5,000	---	---	16,900	16,900	11,300	5,700
		24K	18K	12K	6K	---	20,000	15,000	10,000	5,000	---	---	20,700	15,500	10,400	5,200
		9K	9K	9K	9K	---	9,000	9,000	9,000	9,000	---	---	9,700	9,700	9,700	9,700
		12K	9K	9K	9K	---	12,000	9,000	9,000	9,000	---	---	12,800	9,600	9,600	9,600
		18K	9K	9K	9K	---	18,000	9,000	9,000	9,000	---	---	18,500	9,300	9,300	9,300
		24K	9K	9K	9K	---	22,000	8,000	8,000	8,000	---	---	23,400	8,800	8,800	8,800
		30K	9K	9K	9K	---	26,000	8,000	8,000	8,000	---	---	27,100	8,200	8,200	8,200
12K	12K	9K	9K	---	12,000	12,000	9,000	9,000	---	---	12,600	12,600	9,500	9,500		
18K	12K	9K	9K	---	17,000	11,000	9,000	9,000	---	---	18,100	12,100	9,100	9,100		
24K	12K	9K	9K	---	22,000	11,000	8,000	8,000	---	---	22,600	11,300	8,500	8,500		

<sup>1</sup> One outdoor unit may be matched with one indoor unit for single zone applications. Additional indoor units can be added at a later date for multi-zone applications (if applicable).

**NOTE - For multi-zone systems, the total capacity of all indoor units must be 66% to 133% of the outdoor unit capacity.**

Outdoor Unit Model No.	Number of Zones	Indoor Unit Capacity					Nominal Cooling Capacity at Rated System Capacity (Btuh)					Nominal Heating Capacity at Rated System Capacity (Btuh)					
		#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	
MLB048S4M MPC048S4M	4	30K	12K	9K	9K	---	25,000	10,000	7,000	7,000	---	25,800	10,400	7,800	7,800	---	
		18K	18K	9K	9K	---	16,000	16,000	8,000	8,000	---	16,900	16,900	8,500	8,500	---	
		24K	18K	9K	9K	---	20,000	15,000	7,000	7,000	---	20,700	15,500	7,800	7,800	---	
		12K	12K	12K	9K	---	12,000	12,000	12,000	9,000	---	12,300	12,300	12,300	9,300	---	
		18K	12K	12K	9K	---	17,000	11,000	11,000	8,000	---	17,500	11,700	11,700	8,800	---	
		24K	12K	12K	9K	---	21,000	10,000	10,000	8,000	---	21,700	10,900	10,900	8,200	---	
		30K	12K	12K	9K	---	24,000	9,000	9,000	7,000	---	24,500	9,800	9,800	7,400	---	
		18K	18K	12K	9K	---	16,000	16,000	10,000	8,000	---	16,300	16,300	10,900	8,200	---	
		24K	18K	12K	9K	---	19,000	14,000	9,000	7,000	---	19,600	14,700	9,800	7,400	---	
		12K	12K	12K	12K	---	11,000	11,000	11,000	11,000	---	12,100	12,100	12,100	12,100	---	
		18K	12K	12K	12K	---	16,000	11,000	11,000	11,000	---	16,900	11,300	11,300	11,300	---	
		24K	12K	12K	12K	---	20,000	10,000	10,000	10,000	---	20,700	10,400	10,400	10,400	---	
		18K	18K	12K	12K	---	15,000	15,000	10,000	10,000	---	15,500	15,500	10,400	10,400	---	
		5	9K	6K	6K	6K	6K	9,000	6,000	6,000	6,000	6,000	10,000	7,000	7,000	7,000	7,000
	12K		6K	6K	6K	6K	6K	12,000	6,000	6,000	6,000	6,000	13,000	6,000	6,000	6,000	6,000
	18K		6K	6K	6K	6K	6K	18,000	6,000	6,000	6,000	6,000	19,000	6,000	6,000	6,000	6,000
	24K		6K	6K	6K	6K	6K	24,000	6,000	6,000	6,000	6,000	25,000	6,000	6,000	6,000	6,000
	30K		6K	6K	6K	6K	6K	28,000	6,000	6,000	6,000	6,000	29,000	5,000	5,000	5,000	5,000
	9K		9K	6K	6K	6K	6K	9,000	9,000	6,000	6,000	6,000	10,000	10,000	6,000	6,000	6,000
	12K		9K	6K	6K	6K	6K	12,000	9,000	6,000	6,000	6,000	13,000	10,000	6,000	6,000	6,000
	18K		9K	6K	6K	6K	6K	18,000	9,000	6,000	6,000	6,000	19,000	9,000	6,000	6,000	6,000
	24K		9K	6K	6K	6K	6K	23,000	9,000	6,000	6,000	6,000	24,000	9,000	6,000	6,000	6,000
	30K		9K	6K	6K	6K	6K	27,000	8,000	5,000	5,000	5,000	28,000	8,000	5,000	5,000	5,000
	12K		12K	6K	6K	6K	6K	12,000	12,000	6,000	6,000	6,000	13,000	13,000	6,000	6,000	6,000
	18K		12K	6K	6K	6K	6K	18,000	12,000	6,000	6,000	6,000	18,000	12,000	6,000	6,000	6,000
	24K		12K	6K	6K	6K	6K	22,000	11,000	6,000	6,000	6,000	23,000	11,000	5,000	5,000	5,000
	30K		12K	6K	6K	6K	6K	26,000	10,000	5,000	5,000	5,000	27,000	10,000	5,000	5,000	5,000
	18K		18K	6K	6K	6K	6K	17,000	17,000	6,000	6,000	6,000	17,000	17,000	5,000	5,000	5,000
	24K		18K	6K	6K	6K	6K	21,000	16,000	5,000	5,000	5,000	21,000	16,000	5,000	5,000	5,000
	9K		9K	9K	6K	6K	6K	9,000	9,000	9,000	6,000	6,000	10,000	10,000	10,000	6,000	6,000
	12K		9K	9K	6K	6K	6K	12,000	9,000	9,000	6,000	6,000	13,000	9,000	9,000	6,000	6,000
	18K		9K	9K	6K	6K	6K	18,000	9,000	9,000	6,000	6,000	18,000	9,000	9,000	6,000	6,000
24K	9K		9K	6K	6K	6K	22,000	8,000	8,000	6,000	6,000	23,000	8,000	8,000	5,000	5,000	
30K	9K	9K	6K	6K	6K	26,000	8,000	8,000	5,000	5,000	27,000	8,000	8,000	5,000	5,000		
12K	12K	9K	6K	6K	6K	12,000	12,000	9,000	6,000	6,000	12,000	12,000	9,000	6,000	6,000		
18K	12K	9K	6K	6K	6K	17,000	12,000	9,000	6,000	6,000	18,000	12,000	9,000	6,000	6,000		
24K	12K	9K	6K	6K	6K	22,000	11,000	8,000	5,000	5,000	22,000	11,000	8,000	5,000	5,000		
30K	12K	9K	6K	6K	6K	24,000	10,000	7,000	5,000	5,000	26,000	10,000	7,000	5,000	5,000		
18K	18K	9K	6K	6K	6K	16,000	16,000	8,000	5,000	5,000	17,000	17,000	8,000	5,000	5,000		
24K	18K	9K	6K	6K	6K	20,000	15,000	7,000	5,000	5,000	21,000	15,000	7,000	5,000	5,000		
12K	12K	12K	6K	6K	6K	12,000	12,000	12,000	6,000	6,000	12,000	12,000	12,000	6,000	6,000		
18K	12K	12K	6K	6K	6K	17,000	11,000	11,000	6,000	6,000	17,000	11,000	11,000	5,000	5,000		
24K	12K	12K	6K	6K	6K	21,000	10,000	10,000	5,000	5,000	21,000	10,000	10,000	5,000	5,000		

<sup>1</sup> One outdoor unit may be matched with one indoor unit for single zone applications. Additional indoor units can be added at a later date for multi-zone applications (if applicable).

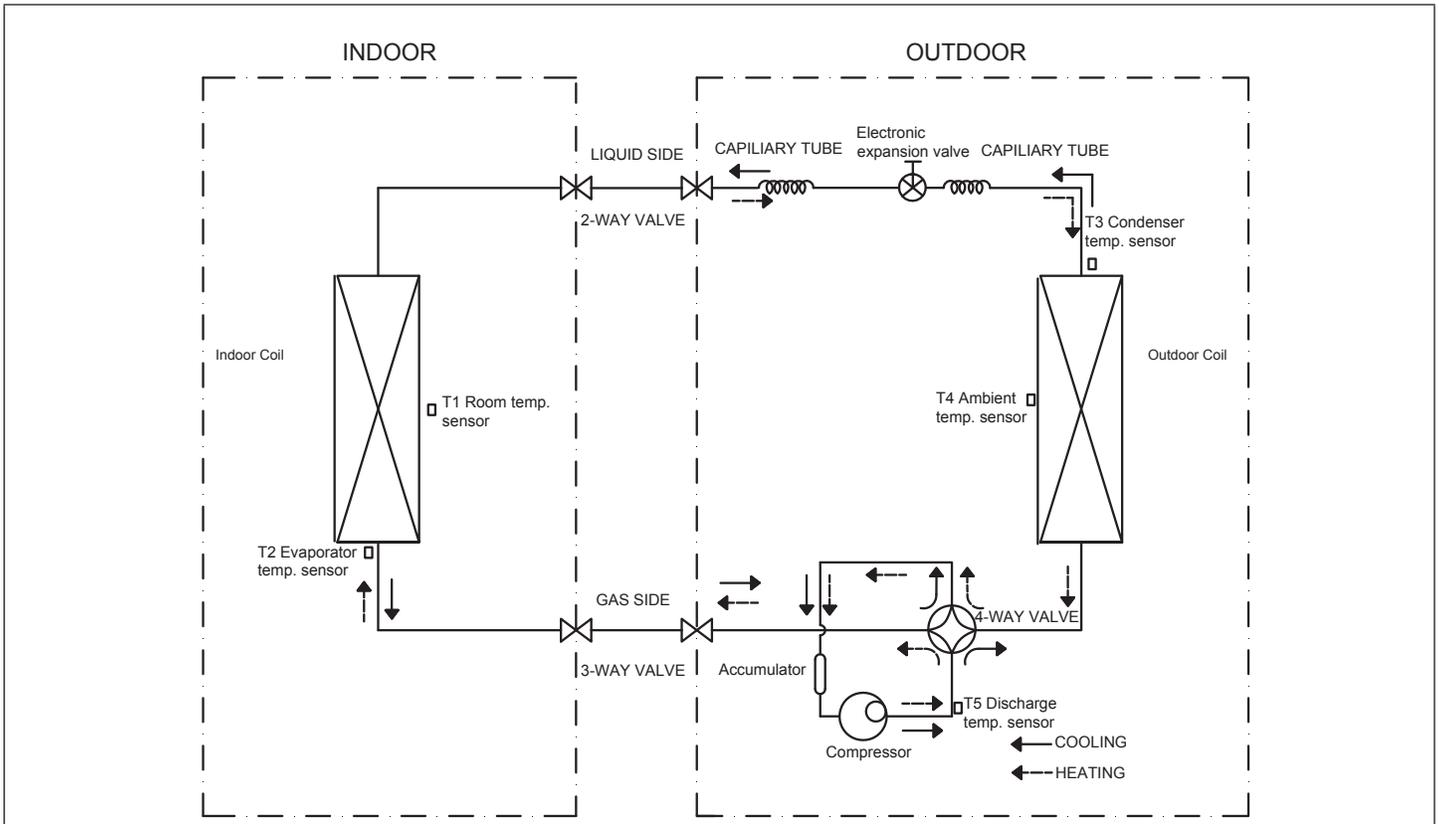
**NOTE - For multi-zone systems, the total capacity of all indoor units must be 66% to 133% of the outdoor unit capacity.**

Outdoor Unit Model No.	Number of Zones	Indoor Unit Capacity					Nominal Cooling Capacity at Rated System Capacity (Btuh)					Nominal Heating Capacity at Rated System Capacity (Btuh)				
		#1	#2	#3	#4	#5	#1	#2	#3	#4	#5	#1	#2	#3	#4	#5
MLB048S4M MPC048S4M	5	18K	18K	12K	6K	6K	16,000	16,000	10,000	5,000	5,000	16,000	16,000	10,000	5,000	5,000
		9K	9K	9K	9K	6K	9,000	9,000	9,000	9,000	6,000	9,000	9,000	9,000	9,000	6,000
		12K	9K	9K	9K	6K	12,000	9,000	9,000	9,000	6,000	12,000	9,000	9,000	9,000	6,000
		18K	9K	9K	9K	6K	17,000	9,000	9,000	9,000	6,000	18,000	9,000	9,000	9,000	6,000
		24K	9K	9K	9K	6K	22,000	8,000	8,000	8,000	5,000	22,000	8,000	8,000	8,000	5,000
		30K	9K	9K	9K	6K	24,000	7,000	7,000	7,000	5,000	26,000	7,000	7,000	7,000	5,000
		12K	12K	9K	9K	6K	12,000	12,000	9,000	9,000	6,000	12,000	12,000	9,000	9,000	6,000
		18K	12K	9K	9K	6K	17,000	11,000	8,000	8,000	6,000	17,000	11,000	8,000	8,000	5,000
		24K	12K	9K	9K	6K	21,000	10,000	8,000	8,000	5,000	21,000	10,000	8,000	8,000	5,000
		18K	18K	9K	9K	6K	16,000	16,000	8,000	8,000	5,000	16,000	16,000	8,000	8,000	5,000
		12K	12K	12K	9K	6K	12,000	12,000	12,000	9,000	6,000	12,000	12,000	12,000	9,000	6,000
		18K	12K	12K	9K	6K	16,000	11,000	11,000	8,000	5,000	17,000	11,000	11,000	8,000	5,000
		24K	12K	12K	9K	6K	20,000	10,000	10,000	7,000	5,000	21,000	10,000	10,000	7,000	5,000
		12K	12K	12K	12K	6K	11,000	11,000	11,000	11,000	6,000	11,000	11,000	11,000	11,000	5,000
		18K	12K	12K	12K	6K	16,000	10,000	10,000	10,000	5,000	16,000	10,000	10,000	10,000	5,000
		9K	9K	9K	9K	9K	9,000	9,000	9,000	9,000	9,000	9,500	9,500	9,500	9,500	9,500
		12K	9K	9K	9K	9K	12,000	9,000	9,000	9,000	9,000	12,000	9,000	9,000	9,000	9,000
		18K	9K	9K	9K	9K	17,000	8,000	8,000	8,000	8,000	17,000	8,000	8,000	8,000	8,000
		24K	9K	9K	9K	9K	21,000	8,000	8,000	8,000	8,000	21,000	8,000	8,000	8,000	8,000
		12K	12K	9K	9K	9K	12,000	12,000	9,000	9,000	9,000	12,000	12,000	9,000	9,000	9,000
		18K	12K	9K	9K	9K	16,000	11,000	8,000	8,000	8,000	17,000	11,000	8,000	8,000	8,000
		24K	12K	9K	9K	9K	20,000	10,000	7,000	7,000	7,000	21,000	10,000	7,000	7,000	7,000
		12K	12K	12K	9K	9K	11,000	11,000	11,000	8,000	8,000	11,000	11,000	11,000	8,000	8,000
		18K	12K	12K	9K	9K	16,000	10,000	10,000	8,000	8,000	16,000	10,000	10,000	8,000	8,000
		12K	12K	12K	12K	9K	11,000	11,000	11,000	11,000	8,000	11,000	11,000	11,000	11,000	8,000
12K	12K	12K	12K	12K	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000		

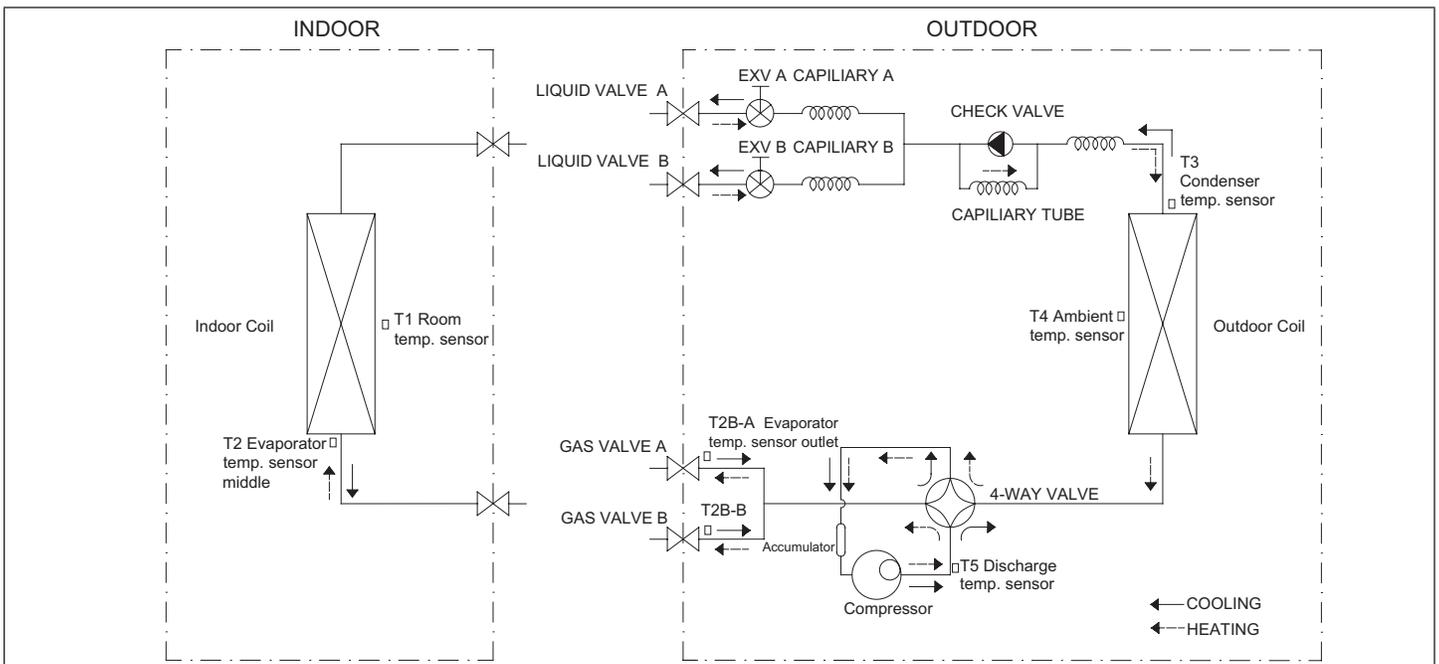
<sup>1</sup> One outdoor unit may be matched with one indoor unit for single zone applications. Additional indoor units can be added at a later date for multi-zone applications (if applicable).

## 8. Refrigeration Pipe Work

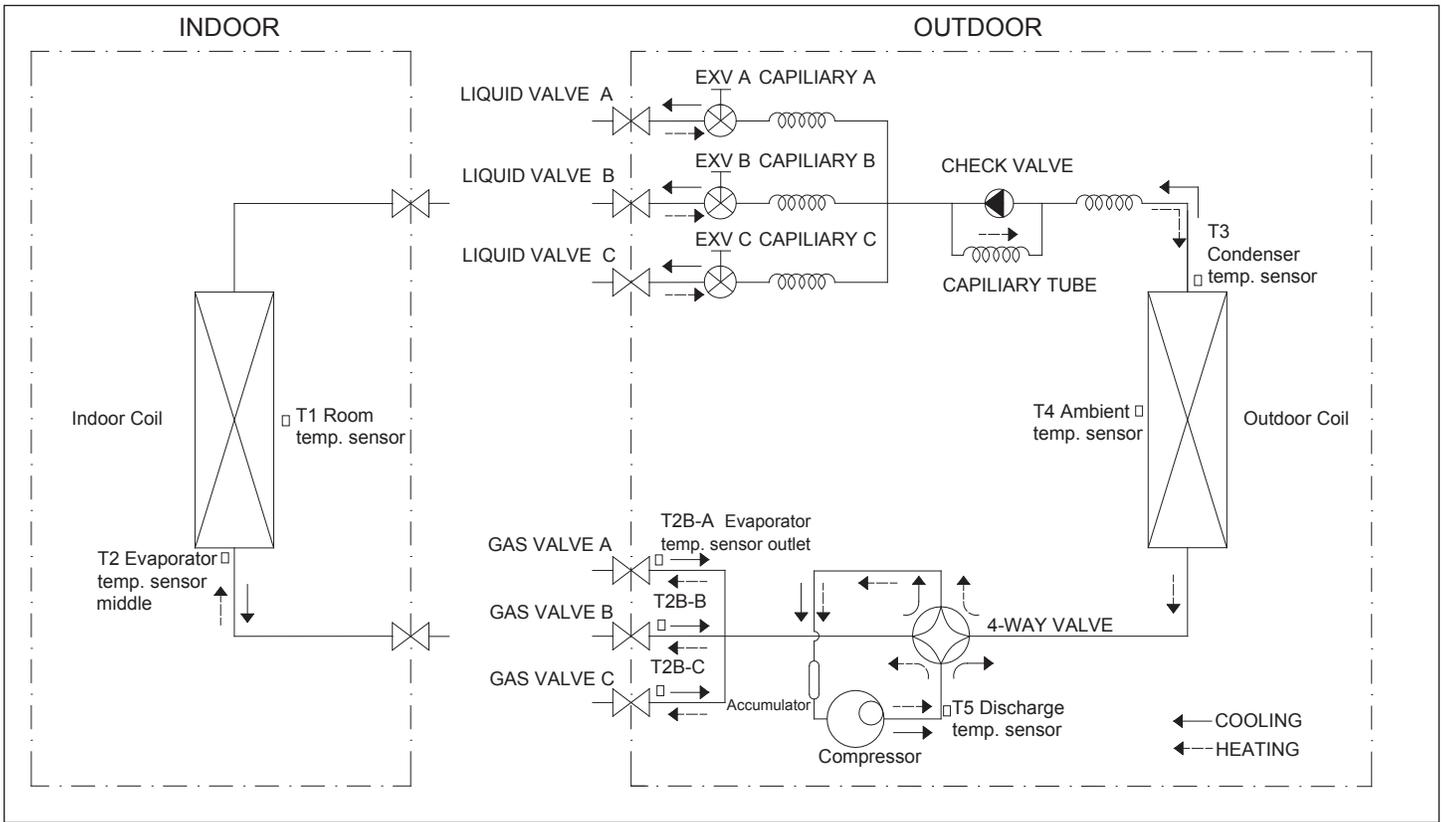
### 8.1. MPC Single-Zone Refrigerant Cycle Diagram



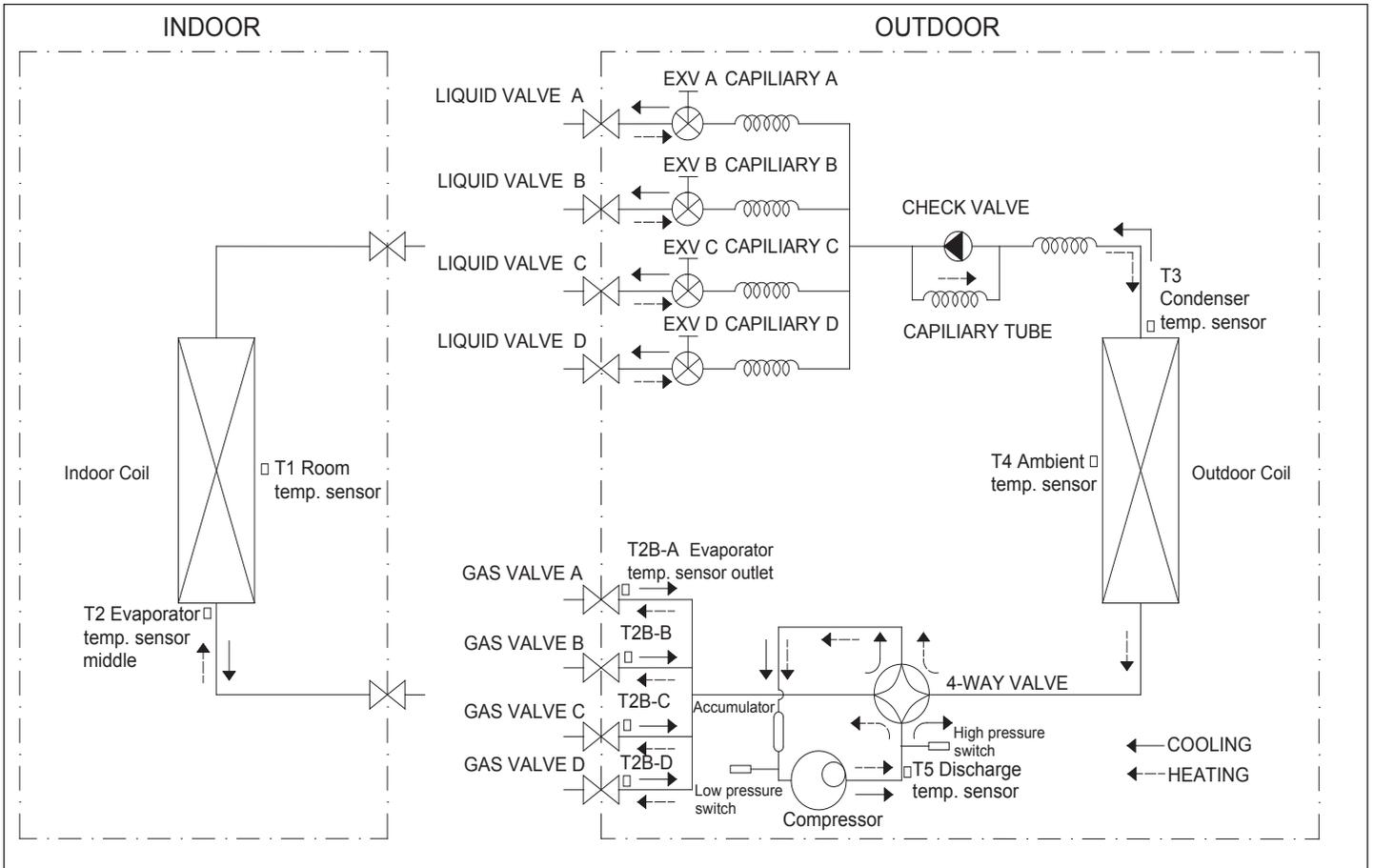
### 8.2. MPC Two-Zone Refrigerant Cycle Diagram



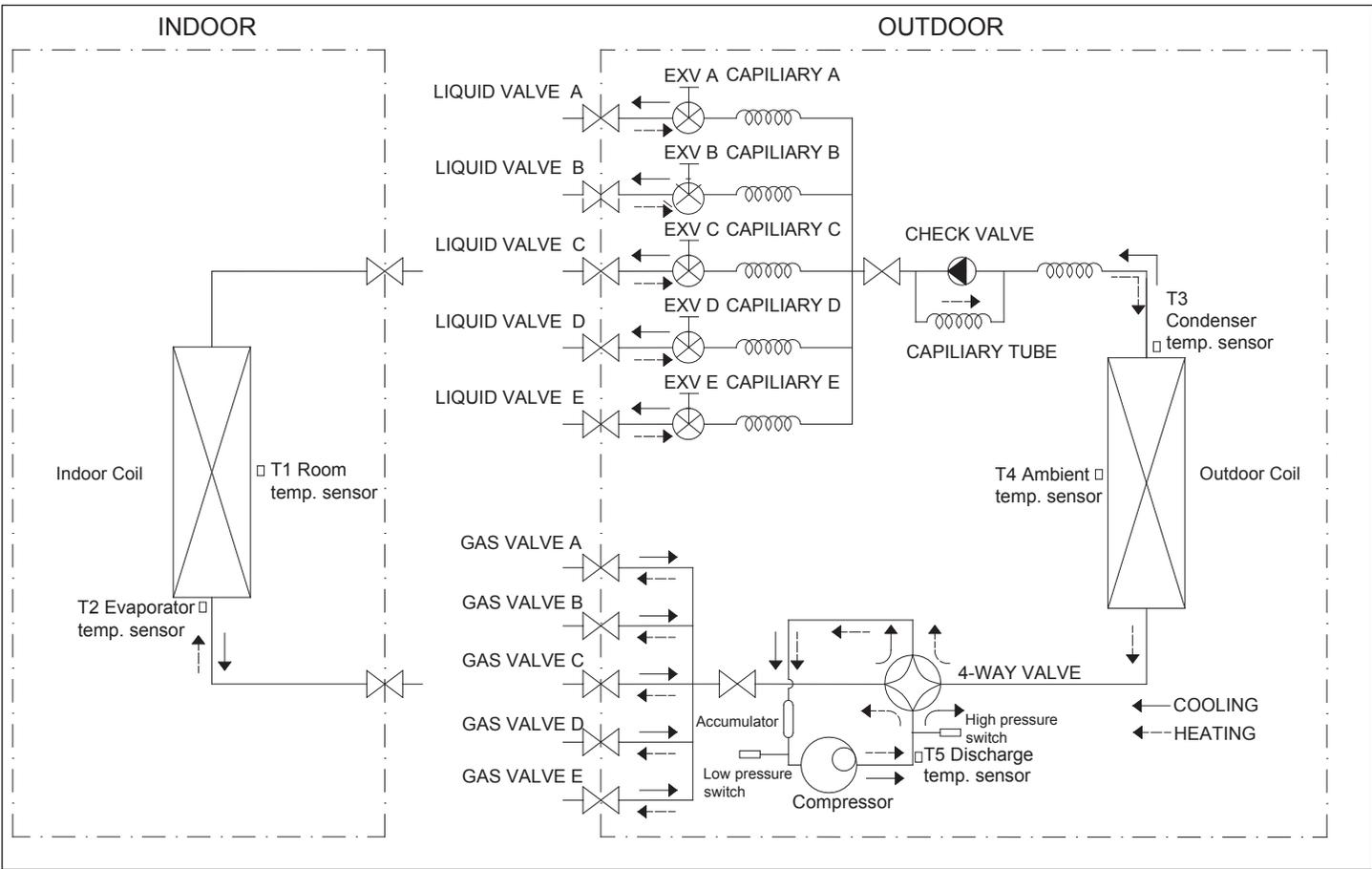
### 8.3. MPC Three-Zone Refrigerant Cycle Diagram



### 8.4. MPC Four-Zone Refrigerant Cycle Diagram



### 8.5. MPC Five-Zone Refrigerant Cycle Diagram



## 8.6. Single-Zone Piping Limitations

**IMPORTANT**

Do not allow for excess length of line sets to be left rolled up as part of the required distance, or in general. This will also cause additional performance issues.

**NOTE:** Note: Each system size has a line set length and vertical elevation parameters.

System Size (KBtu)	Line Set Diameters (in.)		Maximum Elevation Outdoor Unit BELOW Indoor Unit ft. (m)	Maximum Elevation Outdoor Unit ABOVE Indoor Unit ft. (m)	Maximum Line Set Length ft. (m)
	Liquid	Gas			
018	1/4	1/2	66 ft. (20 m)	66 ft. (20 m)	98 ft. (30 m)
024/30	3/8	5/8	82 ft. (25 m)	82 ft. (25 m)	164 ft. (50 m)
036/048/060	3/8	5/8	98 ft. (30 m)	98 ft. (30 m)	213 ft. (65 m)

## 8.7. Multi-Zone Piping Limitations

**CAUTION**

In order to avoid injury, take proper precaution when lifting heavy objects.

**IMPORTANT**

Pipe and wire to each zone separately.  
Test each indoor unit separately to ensure proper operation.

### Connecting Multiple Capacity Indoor Units

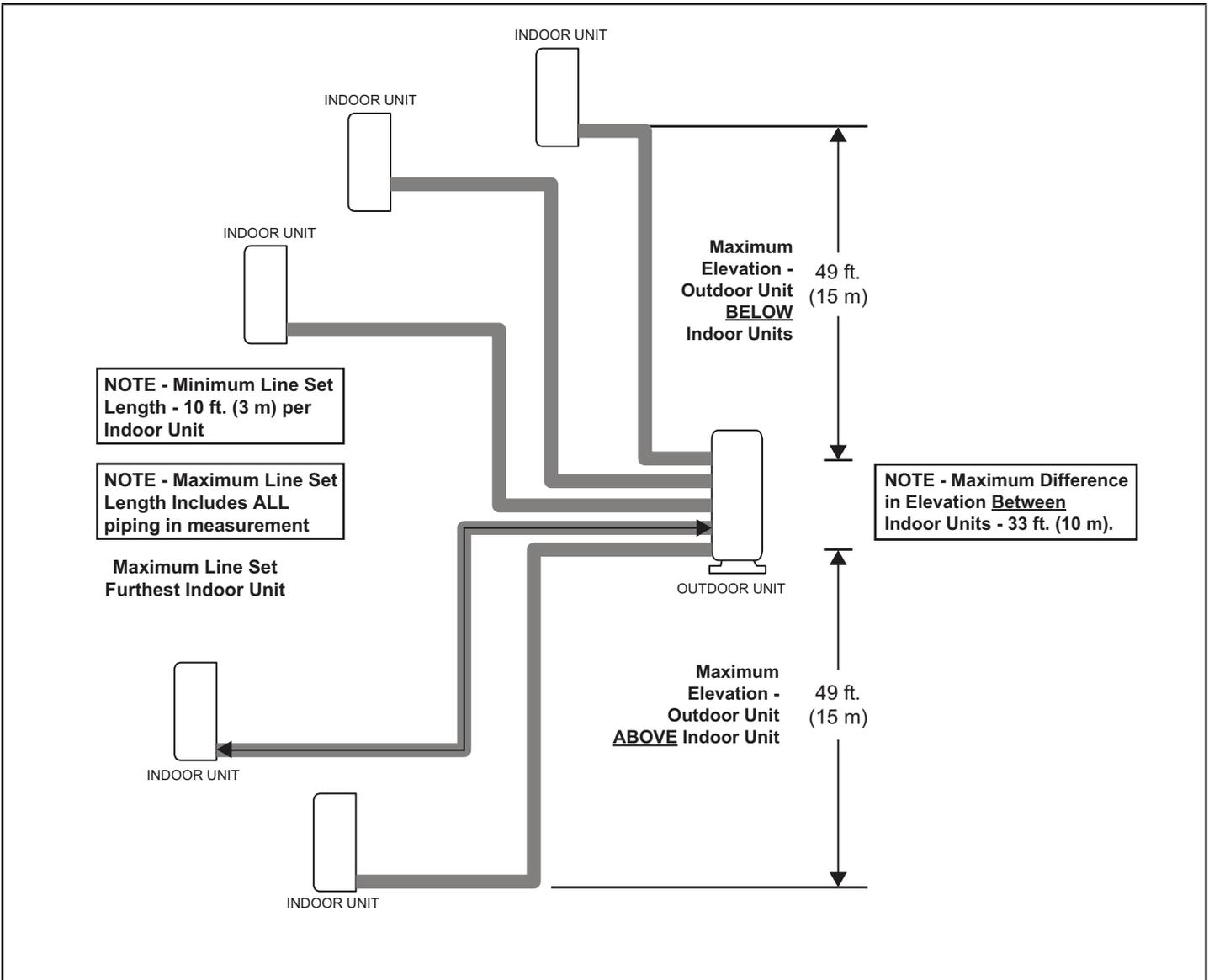
- The largest capacity indoor unit must be connected to the lowest refrigerant connection ports on the outdoor unit.
- The 24,000 Btu indoor unit is only allowed to be connected to MPC036S4M, MPC048S4M, MLB036S4M and MLB048S4M outdoor units.

**NOTE:** Each indoor unit must be piped AND wired to the correct zone piping connections and wiring terminals. Make sure that indoor unit A is wired to the zone A terminal block and connected to the appropriate refrigerant pipe connections.

Connecting Multiple Capacity Indoor Units

Four-Zone System Example Shown Above

Pipe and Wire Each Zone Separately



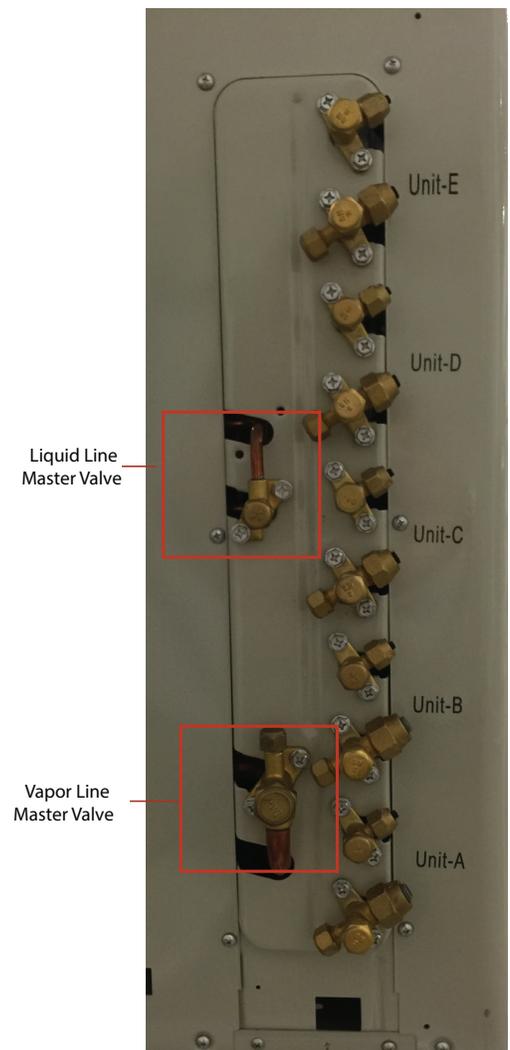
**Figure 20. MPC and MLB Line Set Elevations**

Outdoor Unit Model No.	MPC024S4M	MLB030S4M / MPC030S4M	MLB036S4M / MPC036S4M	MLB048S4M / MPC048S4M
Maximum Number of Indoor Units/Zones	Three	Three	Four	Five
Indoor Unit Connections	(3) 1/4 liq. (3) 3/8 gas	(3) 1/4 liq. (3) 3/8 gas	(4) 1/4 liq. (3) 3/8 gas (1) 1/2 gas	(5) 1/4 liq. (3) 3/8 gas (2) 1/2 gas
Maximum Pipe Length for all Rooms	197 ft. (60 m)	197 ft. (60 m)	262 ft. (80 m)	262 ft. (80 m)
Maximum Line Set Length - Furthest Indoor Unit	98 ft. (30 m)	98 ft. (30 m)	115 ft. (35 m)	115 ft. (35 m)

**NOTE:** Refer to for correct refrigerant line adapters furnished with outdoor units.

## 9. Master Valves (3 to 5 Zone Outdoor Units)

- 3-zone, 4-zone and 5-zone (not 2-zone) multi-zone units have a master valve on each refrigerant line.
- The master valve controls refrigerant to all of the zone-supply valves.
- Open the master valves prior to opening the zone-supply valves.



## 10. MLB and MPC Multi-Zone Outdoor Unit Connections and Line Set Usage

MPC024S4M

Number of Zones and Outdoor Unit Connection Sizes

NOTE - Letter = Indoor Unit Zone Connection on Outdoor Unit

Zone 1 (A)	Zone 2 (B)	Zone 3 (C)
1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas
012	006	---
018	006	---
009	009	---
012	009	---
018	009	---
012	012	---
018	012	---
018	018	---
006	006	006
009	006	006
012	006	006
018	006	006

009	009	006
012	009	006
018	009	006
012	012	006
018	012	006
009	009	009
012	009	009
018	009	009
012	012	009
012	012	012

LEGEND:

CLEAR = No adaptors required.

GRAY = 3/8 x 1/2 in. gas pipe adaptor is required for line set connection to outdoor unit (furnished with outdoor unit).

**MLB030S4M and MPC030S4M**

**Number of Zones and Outdoor Unit Connection Sizes**

**NOTE - Letter = Indoor Unit Zone Connection on Outdoor Unit**

Zone 1 (A)	Zone 2 (B)	Zone 3 (C)
1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas
012	006	---
018	006	---
009	009	---
012	009	---
018	009	---
012	012	---
018	012	---
018	018	---
006	006	006
009	006	006
012	006	006
018	006	006
009	009	006
012	009	006
018	009	006
012	012	006
018	012	006
009	009	009
012	009	009
018	009	009
012	012	009
012	012	012

LEGEND:

CLEAR = No adaptors required.

GRAY = 3/8 x 1/2 in. gas pipe adaptor is required for line set connection to outdoor unit (furnished with outdoor unit).

**MLB036S4M / MPC036S4M**

**Number of Zones and Outdoor Unit Connection Sizes**

**NOTE - Letter = Indoor Unit Zone Connection on Outdoor Unit**

Zone 1 (A)	Zone 2 (B)	Zone 3 (C)	Zone 4 (D)
1/4 in. liq + 1/2 in. gas	1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas
018	006	---	---
024	006	---	---
018	009	---	---
024	009	---	---
012	012	---	---
018	012	---	---
024	012	---	---
018	018	---	---
024	018	---	---
024	<sup>1</sup> 024	---	---
012	006	006	---
018	006	006	---
024	006	006	---
012	009	006	---
018	009	006	---
024	009	006	---
012	012	006	---
018	012	006	---
024	012	006	---
018	018	006	---
024	018	006	---
009	009	009	---
012	009	009	---
018	009	009	---
024	009	009	---
012	012	009	---
018	012	009	---
024	012	009	---
018	018	009	---
012	012	012	---
018	012	012	---
024	012	012	---
018	018	012	---
006	006	006	006
009	006	006	006
012	006	006	006
018	006	006	006
024	006	006	006
009	009	006	006

**LEGEND:**

CLEAR = No adaptors required.

GRAY = 3/8 x 1/2 in. gas pipe adaptor is required for line set connection to outdoor unit (furnished with outdoor unit).

BLACK = 1/4 x 3/8 in. liquid pipe adaptor is required for line set connection to the 036 outdoor unit (furnished with outdoor unit).

<sup>1</sup> 1/2 x 5/8 in. gas pipe adaptor is required for line set connection to the 036 outdoor unit (furnished with outdoor unit).

<sup>1</sup> 1/4 x 3/8 in. liquid pipe adaptor is required for line set connection to the 036 outdoor unit (furnished with outdoor unit).

3/8 x 5/8 in. gas pipe adaptor is required for line set connection to the 036 outdoor unit (not furnished).

**MLB036S4M / MPC036S4M**

**Number of Zones and Outdoor Unit Connection Sizes**

**NOTE - Letter = Indoor Unit Zone Connection on Outdoor Unit**

<b>Zone 1 (A)</b>	<b>Zone 2 (B)</b>	<b>Zone 3 (C)</b>	<b>Zone 4 (D)</b>
<b>1/4 in. liq + 1/2 in. gas</b>	<b>1/4 in. liq + 3/8 in. gas</b>	<b>1/4 in. liq + 3/8 in. gas</b>	<b>1/4 in. liq + 3/8 in. gas</b>
012	009	006	006
018	009	006	006
024	009	006	006
012	012	006	006
018	012	006	006
024	012	006	006
009	009	009	006
012	009	009	006
018	009	009	006
024	009	009	006
012	012	009	006
018	012	009	006
012	012	012	006
018	012	012	006
009	009	009	009
012	009	009	009
018	009	009	009
012	012	009	009
018	012	009	009
012	012	012	009
012	012	012	012

**LEGEND:**

CLEAR = No adaptors required.

GRAY = 3/8 x 1/2 in. gas pipe adaptor is required for line set connection to outdoor unit (furnished with outdoor unit).

BLACK = 1/4 x 3/8 in. liquid pipe adaptor is required for line set connection to the 036 outdoor unit (furnished with outdoor unit).

1/2 x 5/8 in. gas pipe adaptor is required for line set connection to the 036 outdoor unit (furnished with outdoor unit).

<sup>1</sup> 1/4 x 3/8 in. liquid pipe adaptor is required for line set connection to the 036 outdoor unit (furnished with outdoor unit).

3/8 x 5/8 in. gas pipe adaptor is required for line set connection to the 036 outdoor unit (not furnished).

**MLB048S4M / MPC048S4M**

**Number of Zones and Outdoor Unit Connection Sizes**

**NOTE - Letter = Indoor Unit Zone Connection on Outdoor Unit**

Zone 1 (A)	Zone 2 (B)	Zone 3 (C)	Zone 4 (D)	Zone 5 (E)
1/4 in. liq + 1/2 in. gas	1/4 in. liq + 1/2 in. gas	1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas
024	009	---	---	---
030	009	---	---	---
024	012	---	---	---
030	012	---	---	---
018	018	---	---	---
024	018	---	---	---
024	024	---	---	---
030	018	---	---	---
030	024	---	---	---
030	030	---	---	---
024	006	006	---	---
030	006	006	---	---
024	009	006	---	---
030	009	006	---	---
018	012	006	---	---
024	012	006	---	---
030	012	006	---	---
018	018	006	---	---
024	018	006	---	---
030	018	006	---	---
024	024	006	---	---
030	024	006	---	---
018	009	009	---	---
024	009	009	---	---
030	009	009	---	---
012	012	009	---	---
018	012	009	---	---
024	012	009	---	---
030	012	009	---	---
018	018	009	---	---
024	018	009	---	---
030	018	009	---	---
024	024	009	---	---
030	024	009	---	---
012	012	012	---	---
018	012	012	---	---
024	012	012	---	---
030	012	012	---	---
018	018	012	---	---
024	018	012	---	---
030	018	012	---	---

**LEGEND:**

CLEAR = No adaptors required.

GRAY = 3/8 x 1/2 in. gas pipe adaptor is required for line set connection to outdoor unit (furnished with outdoor unit).

BLACK = 1/4 x 3/8 in. liquid pipe adaptor is required for line set connection to the 048 outdoor unit (furnished with outdoor unit).  
 1/2 x 5/8 in. gas pipe adaptor is required for line set connection to the 048 outdoor unit (furnished with outdoor unit).

**MLB048S4M / MPC048S4M**

**Number of Zones and Outdoor Unit Connection Sizes**

**NOTE - Letter = Indoor Unit Zone Connection on Outdoor Unit**

Zone 1 (A)	Zone 2 (B)	Zone 3 (C)	Zone 4 (D)	Zone 5 (E)
1/4 in. liq + 1/2 in. gas	1/4 in. liq + 1/2 in. gas	1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas	1/4 in. liq + 3/8 in. gas
024	024	012	---	---
018	018	018	---	---
024	018	018	---	---
018	006	006	006	---
024	006	006	006	---
030	006	006	006	---
018	009	006	006	---
024	009	006	006	---
030	009	006	006	---
012	012	006	006	---
018	012	006	006	---
024	012	006	006	---
030	012	006	006	---
018	018	006	006	---
024	018	006	006	---
030	018	006	006	---
024	024	006	006	---
012	009	009	006	---
018	009	009	006	---
024	009	009	006	---
030	009	009	006	---
012	012	009	006	---
018	012	009	006	---
024	012	009	006	---
030	012	009	006	---
018	018	009	006	---
024	018	009	006	---
030	018	009	006	---
012	012	012	006	---
018	012	012	006	---
024	012	012	006	---
030	012	012	006	---
018	018	012	006	---
024	018	012	006	---
009	009	009	009	---
012	009	009	009	---
018	009	009	009	---
024	009	009	009	---
030	009	009	009	---
012	012	009	009	---
018	012	009	009	---

**LEGEND:**

CLEAR = No adaptors required.

GRAY = 3/8 x 1/2 in. gas pipe adaptor is required for line set connection to outdoor unit (furnished with outdoor unit).

BLACK = 1/4 x 3/8 in. liquid pipe adaptor is required for line set connection to the 048 outdoor unit (furnished with outdoor unit).  
 1/2 x 5/8 in. gas pipe adaptor is required for line set connection to the 048 outdoor unit (furnished with outdoor unit).

**MLB048S4M / MPC048S4M**

**Number of Zones and Outdoor Unit Connection Sizes**

**NOTE - Letter = Indoor Unit Zone Connection on Outdoor Unit**

<b>Zone 1 (A)</b>	<b>Zone 2 (B)</b>	<b>Zone 3 (C)</b>	<b>Zone 4 (D)</b>	<b>Zone 5 (E)</b>
<b>1/4 in. liq + 1/2 in. gas</b>	<b>1/4 in. liq + 1/2 in. gas</b>	<b>1/4 in. liq + 3/8 in. gas</b>	<b>1/4 in. liq + 3/8 in. gas</b>	<b>1/4 in. liq + 3/8 in. gas</b>
024	012	009	009	---
030	012	009	009	---
018	018	009	009	---
024	018	009	009	---
012	012	012	009	---
018	012	012	009	---
024	012	012	009	---
030	012	012	009	---
018	018	012	009	---
024	018	012	009	---
012	012	012	012	---
018	012	012	012	---
024	012	012	012	---
018	018	012	012	---
009	006	006	006	006
012	006	006	006	006
018	006	006	006	006
024	006	006	006	006
030	006	006	006	006
009	009	006	006	006
012	009	006	006	006
018	009	006	006	006
024	009	006	006	006
030	009	006	006	006
012	012	006	006	006
018	012	006	006	006
024	012	006	006	006
030	012	006	006	006
018	018	006	006	006
024	018	006	006	006
009	009	009	006	006
012	009	009	006	006
018	009	009	006	006
024	009	009	006	006
030	009	009	006	006
012	012	009	006	006
018	012	009	006	006
024	012	009	006	006
030	012	009	006	006
018	018	009	006	006
024	018	009	006	006

**LEGEND:**

CLEAR = No adaptors required.

GRAY = 3/8 x 1/2 in. gas pipe adaptor is required for line set connection to outdoor unit (furnished with outdoor unit).

BLACK = 1/4 x 3/8 in. liquid pipe adaptor is required for line set connection to the 048 outdoor unit (furnished with outdoor unit).  
 1/2 x 5/8 in. gas pipe adaptor is required for line set connection to the 048 outdoor unit (furnished with outdoor unit).

**MLB048S4M / MPC048S4M**

**Number of Zones and Outdoor Unit Connection Sizes**

**NOTE - Letter = Indoor Unit Zone Connection on Outdoor Unit**

<b>Zone 1 (A)</b>	<b>Zone 2 (B)</b>	<b>Zone 3 (C)</b>	<b>Zone 4 (D)</b>	<b>Zone 5 (E)</b>
<b>1/4 in. liq + 1/2 in. gas</b>	<b>1/4 in. liq + 1/2 in. gas</b>	<b>1/4 in. liq + 3/8 in. gas</b>	<b>1/4 in. liq + 3/8 in. gas</b>	<b>1/4 in. liq + 3/8 in. gas</b>
012	012	012	006	006
018	012	012	006	006
024	012	012	006	006
018	018	012	006	006
009	009	009	009	006
012	009	009	009	006
018	009	009	009	006
024	009	009	009	006
030	009	009	009	006
012	012	009	009	006
018	012	009	009	006
024	012	009	009	006
018	018	009	009	006
012	012	012	009	006
018	012	012	009	006
024	012	012	009	006
012	012	012	012	006
018	012	012	012	006
009	009	009	009	009
012	009	009	009	009
018	009	009	009	009
024	009	009	009	009
012	012	009	009	009
018	012	009	009	009
024	012	009	009	009
012	012	012	009	009
018	012	012	009	009
012	012	012	012	009
012	012	012	012	012

**LEGEND:**

CLEAR = No adaptors required.

GRAY = 3/8 x 1/2 in. gas pipe adaptor is required for line set connection to outdoor unit (furnished with outdoor unit).

BLACK = 1/4 x 3/8 in. liquid pipe adaptor is required for line set connection to the 048 outdoor unit (furnished with outdoor unit).

1/2 x 5/8 in. gas pipe adaptor is required for line set connection to the 048 outdoor unit (furnished with outdoor unit).

## 11. Power and Communication Wiring for Systems

### CAUTION

This unit must be properly grounded and protected by a circuit breaker. The ground wire for the unit must not be connected to a gas or water pipe, a lightning conductor or a telephone ground wire.

**Do not connect power wires to the outdoor unit until all other wiring and piping connections have been completed.**

**Install all wiring at least 3 feet (1 m) away from televisions, radios, LEDs, or other electronic devices in order to avoid the possibility of interference with the unit operation.**

**Do not install the unit near a lighting appliance that includes a ballast. The ballast may affect remote control operation.**

### WARNING

**Isolate the power supply before accessing unit electrical terminals.**

**Install unit so that unit disconnect is accessible.**

**Follow all local and national codes, as well as this installation instruction, during installation. Do NOT overload electrical circuit, as this may lead to failure and possible fire.**

**Use specified wiring and cable to make electrical connections. Clamp cables securely and make sure that connections are tight to avoid strain on wiring. Insecure wiring connections may result in equipment failure and risk of fire. Wiring must be installed so that all cover plates can be securely closed.**

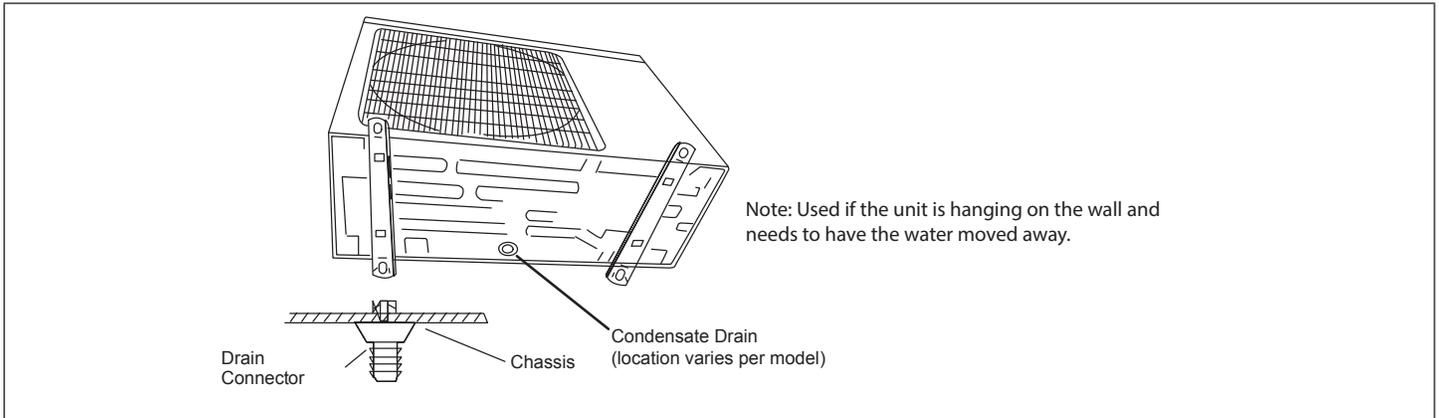
In the U.S.A., wiring must conform with current local codes and the current National Electric Code (NEC). In Canada, wiring must conform with current local codes and the current Canadian Electrical Code (CEC).

Refer to unit nameplate for minimum circuit ampacity and maximum over-current protection size.

- All indoor units are powered by the outdoor unit.
- Make all electrical power wiring connections at the outdoor unit.
- Size outdoor unit power per local code and power requirements.
- Connect wiring between indoor and outdoor terminals.
- Refer to unit name plate for rated voltage.
- Be sure to reattach all electrical box covers after connections are complete.
- Follow NEC/CEC standards and all local and state codes during wiring installation.

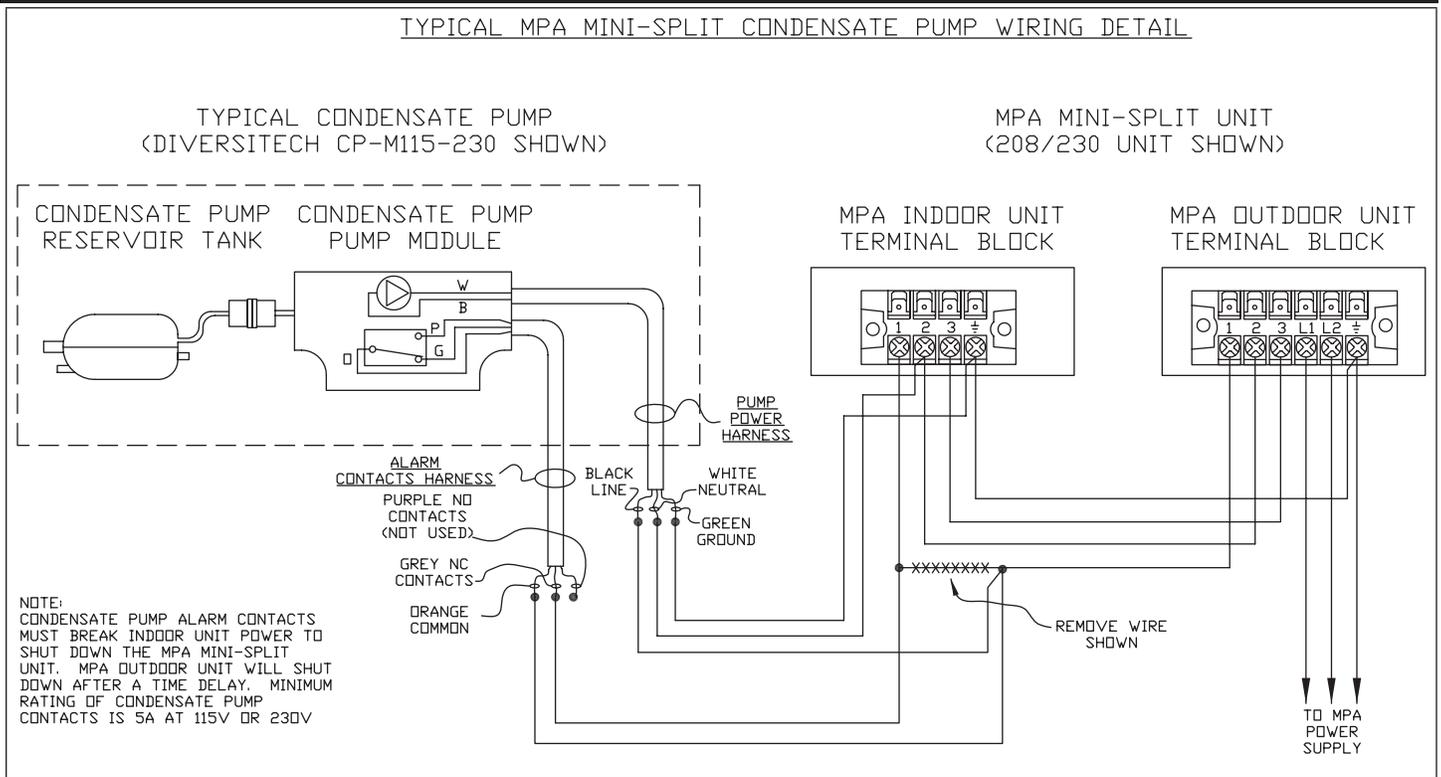
## 12. Outdoor Unit Condensate Piping

Condensate formed during the heating and defrost processes must be drained from heat pump units. Drain holes are provided in the base of the units to ensure proper drainage. Heat pumps must be raised when installed on a concrete pad or the ground to allow drainage to occur. If the heat pump unit is installed on wall mounting brackets, insert the provided drain connector into one of the 1 inch (25 mm) drain holes and attached a field-provided insulated drain hose to the connector. Use field-provided rubber plugs to cover any unused drain holes.

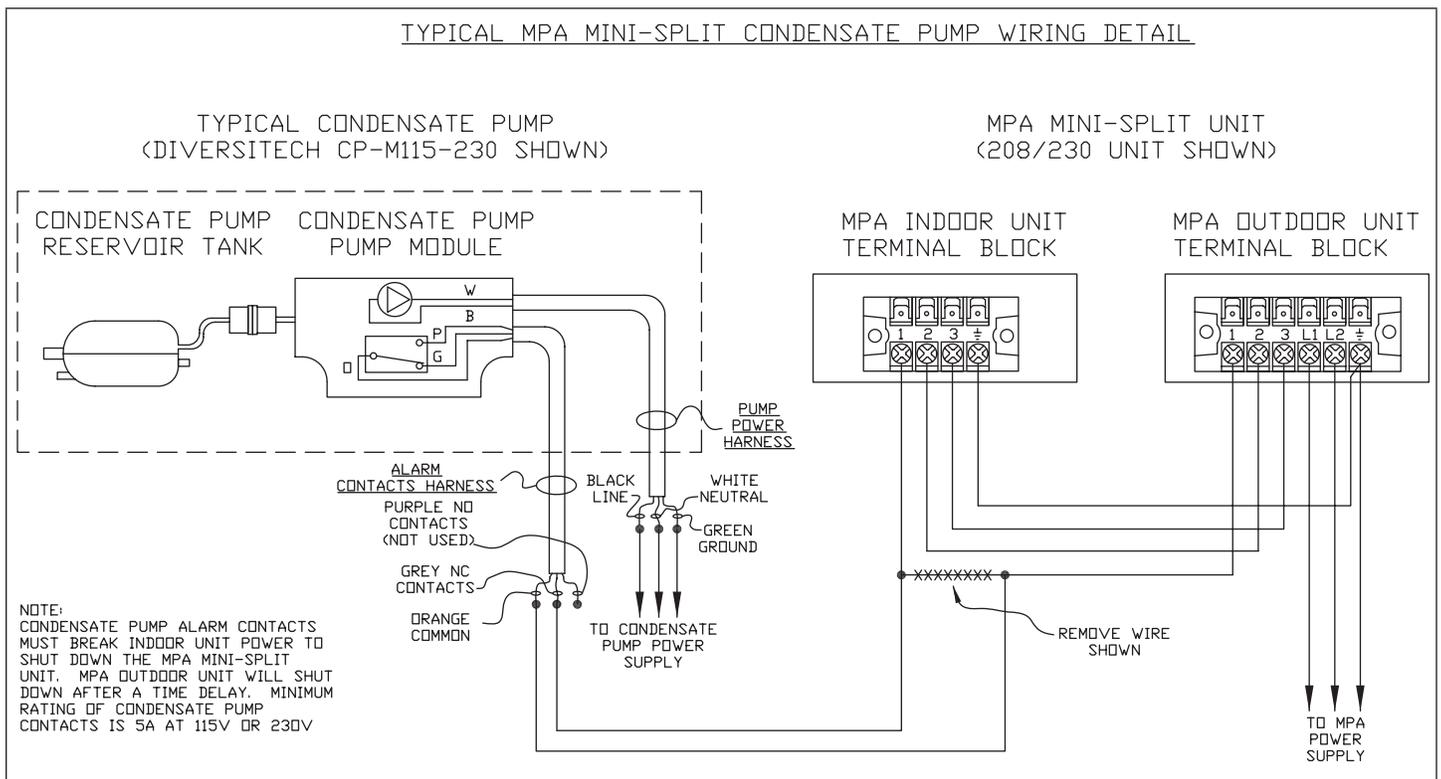


**Figure 21. Condensate Drainage Requirement**

### 13. MPC Condensate Pump Diagrams



**Figure 22. MPC Condensate Pump Powered by MPA Wiring Diagram**



**Figure 23. MPC Condensate Pump Powered by Separate Source Wiring Diagram**

## 14. Installation Requirements

### 14.1. Torque Requirements

# CAUTION

Refrigerant pipe diameter is different according to indoor unit to be connected. When using the extension pipe, refer to the tables below.

When refrigerant pipe diameter is different from that of the outdoor unit connector (18K indoor unit) an additional adapter is required.

**Table 6. Torque**

Outside Diameter		Torque	Additional Tightening
MM	Inches	v.cm	N.cm
Φ6.35	1/4	1500 (153kgf.cm)	1600 (163kgf.cm)
Φ9.52	3/8	2500 (255kgf.cm)	2600 (265kgf.cm)
Φ12.7	1/2	3500 (357kgf.cm)	3600 (367kgf.cm)

### 14.2. Pipe Length and Elevation

Maximum piping length and height difference.

**Table 7. Pipe Diameter - MM (Inches)**

Model	Indoor Unit		Extension Pipe Diameter (mm/inches)	
	Pipe Diameter (mm/inches)			
18K	Liquid	6.35 (1/4)	Liquid	6.35 (1/4)
	Gas	12.7 (1/2)	Gas	12.7 (1/2)
24K	Liquid	9.52 (3/8)	Liquid	9.52 (3/8)
	Gas	15.9 (5/8)	Gas	15.9 (5/8)
24K	1 drive 2		Liquid	6.35 (1/4) *2
			Gas	9.52 (3/8) *2
30K	1 drive 3		Liquid	6.35 (1/4) *3
			Gas	9.52 (3/8) *3
36K	1 drive 4		Liquid	6.35 (1/4) *4
			Gas	9.52 (3/8) *3
				12.7 (1/2) *1
48K	1 drive 5		Liquid	6.35 (1/4) *5
			Gas	9.52 (3/8) *3
				12.7 (1/2) *2

**Table 8. Line Set Length - Meters (Feet)**

Length	1 Drive 2	1 Drive 3	1 Drive 4	1 Drive 5
Max. length for all rooms (m)	40 (131)	60 (197)	80 (262)	80 (262)
Max. length for one IU (m)	25 (82)	30 (98)	35 (115)	35 (115)
Max. height difference between IU and OU (m)	15 (49.2)	15 (49.2)	15 (49.2)	15 (49.2)
Max. height difference between IUs (m)	10 (33)	10 (33)	10 (33)	10 (33)

### 14.2.1. Additional Refrigerant Charge

Table 9. Additional Refrigerant Charge

Outdoor Unit Size (KBtu)	Pipe Length (feet / meters)	Amount of Refrigerant to add
18	>25 (7.5)	0.16 oz/ft (15g/m)
24	>25 (7.5)	0.32 oz/ft (30g/m)
36	>25 (7.5)	0.32 oz/ft (30g/m)
48	>25 (7.5)	0.32 oz/ft (30g/m)
60	>25 (7.5)	0.32 oz/ft (30g/m)

*Note: 1/4" = 0.16 oz/ft; 3/8" = 0.32 oz/ft*

### 14.2.2. Gas Leak Check with Soap Water:

Apply soap water or a liquid neutral detergent on the connections with a soft brush to check for leakage in the pipe connecting points. If bubbles emerge, the pipes are leaking.

### 14.2.3. Air and Moisture

Air and moisture in the refrigerant system cause the following problems:

- Increases in system pressure
- Increases in operating current
- Decreases in cooling and heating efficiency
- Blocks in capillary tubing caused by moisture in the refrigerant circuit freezing
- Corrosion of parts in the refrigerant system caused by water

The indoor units and the pipes between indoor and outdoor units must be tested for leakages and evacuated to remove gas and moisture from the system.

### 14.2.4. Air Purging using a Vacuum Pump

- Completely tighten the flare nuts on the indoor and outdoor units. Confirm that both the 2-way (liquid side) and 3-way (suction side) valves are set to the closed position.
- Connect the suction side charge hose to the gas valve service port.
- Connect the high side charge hose to the vacuum pump.
- Fully open the suction side of the manifold valve.
- Turn on the vacuum pump to begin evacuation.
- Conduct a 30-minute evacuation. Check whether the compound meter indicates - 0.1Mpa(14.5Psi). If the meter does not indicate -0.1Mpa (14.5Psi) after 30 minutes has elapsed, continue evacuation for 20 more minutes. If the pressure does not reach - 0.1Mpa (14.5Psi) after 50 minutes has elapsed, check if there are any leaks.
- Fully close the suction side of the manifold valve and turn off the vacuum pump. After 5 minutes, confirm that the gauge needle is not moving.
- Turn the flare nut on the suction side valve 45° counterclockwise for 6-7 seconds. Once gas begins to come out, tighten the flare nut. Make sure the pressure display on the pressure indicator is higher than atmospheric pressure. Then remove the charge hose from the suction side valve.
- Fully open the liquid side and suction side valves and securely tighten the cap on the suction side valve.

### 14.2.5. Adding Refrigerant if Pipe Length Exceeds Charge Less Pipe Length

Connect the charge hose to the charging cylinder and open the liquid side and suction side valves. With the charge hose you disconnected from the vacuum pump, connect it to the valve at the bottom of the cylinder.

If the refrigerant is R410A, place the cylinder bottom-up to ensure liquid charging is possible.

- Purge the air from the charge hose.
- Open the valve at the bottom of the cylinder and press the check valve on the charge set (be careful of the liquid refrigerant).
- Place the charging cylinder onto the electronic scale and record the weight.
- Turn on the air conditioner in cooling mode.
- Open the valves (Low side) on the charge set. Charge the system with liquid refrigerant.
- When the electronic scale displays the proper weight (refer to the table), disconnect the charge hose from the suction side valve's service port immediately and turn off the air conditioner before disconnecting the hose.
- Mount the valve stem caps and the service port. Use a torque wrench to tighten the service port cap to a torque of 18N.m (13.27 ft·lbs).
- Be sure to check for gas leaks.

### 14.2.6. Add Refrigerant after Long-Term System Operation

- Connect the charge hose to the suction side service port and open the liquid side and suction side valves.
- Connect the charge hose to the valve at the bottom of the cylinder. If the refrigerant is R410A, place the cylinder bottom-up to ensure liquid charge.
- Purge the air from the charge hose.
- Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).
- Place the charging cylinder onto the electronic scale and record the weight.
- Turn on the air conditioner in cooling mode.
- Open the valves (Low side) on the charge set and charge the system with liquid refrigerant.
- When the electronic scale displays the proper weight (refer to the gauge and the pressure of the low side), disconnect the charge hose from the suction side valve's service port immediately and turn off the air conditioner before disconnecting the hose.
- Mount the valve stem caps and the service port. Use torque wrench to tighten the service port cap to a torque of 18N.m(13.27 ft·lbs).
- Be sure to check for gas leaks.

### 14.2.7. Servicing Indoor Unit Refrigeration Circuit

#### 14.2.7.1 Collecting Refrigerant into Outdoor Unit

- Confirm that both the liquid side and suction side valves are set to the opened position
- Remove the valve stem caps and confirm that the valve stems are in the opened position.
- Be sure to use a hexagonal wrench to operate the valve stems.
- Connect the suction side charge hose to the gas valve service port.
- Air purging of the charge hose - Open the suction side of the manifold valve slightly to purge air from the charge hose for 5 seconds and then close it quickly.
- Set the liquid side valve to the close position. 5). Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 0.1MPa (14 psi).

- Set the suction side valve to the closed position immediately
- Do this quickly so that the gauge ends up indicating 0.3 to 0.5Mpa (43 - 72 psi).
- Disconnect the charge set, and tighten the liquid side and suction side valve's stem nuts.
- Use a torque wrench to tighten the suction side valves service port cap to a torque of 18N.m.
- Be sure to check for gas leakage.

#### **14.2.7.2 Air Purging with Vacuum Pump**

- Completely tighten the flare nuts of the indoor and outdoor units, confirm that both the liquid side and suction side valves are set to the closed position.
- Connect the suction side charge hose to the gas valve service port.
- Connect the high side charge hose to the vacuum pump.
- Fully open the suction side of the manifold valve.
- Operate the vacuum pump to evacuate.
- Make evacuation for 30 minutes and check whether the compound meter indicates - 0.1Mpa (500 microns). If the meter does not indicate - 0.1Mpa (500 microbars) after pumping 30 minutes, it should be pumped 20 minutes more. If the pressure can't achieve -0.1Mpa (500 microbars) after pumping 50 minutes, please check if there are some leakage points.
- Fully close the suction side of the manifold valve and stop the operation of the vacuum pump. Confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
- Turn the flare nut of the suction side valves about 45° counterclockwise for 6 or 7 seconds after the gas coming out, then tighten the flare nut again. Make sure the pressure display in the pressure indicator is a little higher than the atmosphere pressure. Then remove the charge hose from the suction side valve.
- Fully open the liquid side valve and suction side valve and securely tighten the cap of the suction side.

## 14.2.8. Evacuation after Servicing the Outdoor Unit Refrigeration Circuit

### 14.2.8.1 Evacuation of the Complete Refrigeration Circuit, Indoor and Outdoor Unit

- Confirm that both the liquid side and suction side valves are set to the opened position.
- Connect the vacuum pump to suction side valve's service port.
- Evacuation for approximately one hour. Confirm that the compound meter indicates - 0.1Mpa (500 Microns / 29.9 in. hg).
- Close the valve (Low side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).
- Disconnect the charge hose from the vacuum pump.

### 14.2.8.2 Refrigerant Charging

- Connect the charge hose to the charging cylinder, open the liquid side valve and the suction side valve.
- Connect the charge hose which you disconnected from the vacuum pump to the valve at the bottom of the cylinder. If the refrigerant is R410A, make the cylinder bottom up to ensure liquid charge.
- Purge the air from the charge hose
- Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air (be careful of the liquid refrigerant).
- Put the charging cylinder onto the electronic scale and record the weight.
- Open the valves (Low side) on the charge set and charge the system with liquid refrigerant. If the system cannot be charged with the specified amount of refrigerant, charged a little at a time (approximately 150g each time) in the cooling cycle. Wait approximately one minute before repeating the procedure until it is properly charged.
- When the electronic scale displays the proper weight, disconnect the charge hose from the suction side valve's service port immediately
- If the system has been charged with liquid refrigerant while operating the air conditioner, turn off the air conditioner before disconnecting the hose.
- Mounted the valve stem caps and the service port. Use torque wrench to tighten the service port cap to a torque of 18N·m (13.27 ft·lbs).
- Always leak check after servicing the refrigerant system.
- There is one master suction valve and one master liquid valve; it save time when vacuuming and recycling refrigerant. But refer to the previous instruction when vacuum and recycle refrigerant.

## 15. Electronic Function

### 15.1. Abbreviations

- T1: Indoor ambient temperature
- T2: Middle indoor heat exchanger coil temperature
- T2B: Indoor heat exchanger exhaust coil temperature (located on the outdoor unit)
- T3: Outdoor heat exchanger pipe temperature
- T4: Outdoor ambient temperature
- T5: Compressor discharge temperature

## 15.2. Electric Control Working Environment.

- Input voltage: 230V.
- Input power frequency: 60Hz.
- Indoor fan standard working amp.: <1A
- Outdoor fan standard working amp.: <1.5A.
- Four-way valve standard amp.: <1A

## 16. Start-Up

### 16.1. Adding Refrigerant - Single-Zone Systems

The outdoor unit is factory-charged with refrigerant. Calculate the additional refrigerant required according to the diameter and the length of the liquid pipe between the outdoor unit and indoor unit connections.

Be sure to add the proper amount of additional refrigerant. Failure to do so may result in reduced performance.

**NOTE:** *Interconnecting pipe work between outdoor and indoor units must be 10 ft. or longer.*

**NOTE:** *Do not remove refrigerant for line lengths less than 25 ft. R-410A is a blended refrigerant. If you must remove charge, it is necessary to remove the entire charge and weigh in the new charge.*

**Table 10. Adding Refrigerant**

System Size (KBtu)	Pipe Length	Amount of Refrigerant to add
18	>25 (7.5)	0.16 oz/ft (15g/m)
24	>25 (7.5)	0.32 oz/ft (30g/m)
30	>25 (7.5)	0.32 oz/ft (30g/m)
36	>25 (7.5)	0.32 oz/ft (30g/m)
48	>25 (7.5)	0.32 oz/ft (30g/m)
60	>25 (7.5)	0.32 oz/ft (30g/m)
<b>Note:</b> 1/4" = 0.16 oz/ft; 3/8" = 0.32 oz/ft		

### 16.2. Adding Refrigerant - Multi-Zone Systems

The outdoor unit is factory-charged with refrigerant. Calculate the additional refrigerant required according to the length of the liquid pipe (one way) between the outdoor unit and each indoor unit connection.

Be sure to add the proper amount of additional refrigerant. Failure to do so may result in reduced performance.

**NOTE:** *Interconnecting pipe work between outdoor and indoor units must be 10 ft. or longer.*

*Do not remove refrigerant for line lengths less than 25 ft. R-410A is a blended refrigerant. If you must remove charge, it is necessary to remove the entire charge and weigh in the new charge.*

**Table 1. Adding Refrigerant**

System	Pre-charge Pipe Length	Amount of Refrigerant to add
Two-port	50 ft. (15 m)	0.16 oz [(L1 ft + L2 ft) - 50 ft] 0.005 kg [(L1 m + L2 m) - 15 m]
Three-port	75 ft. (23 m)	0.16 oz [(L1 ft + L2 ft + L3 ft) - 75 ft] 0.005 kg [(L1 m + L2 m + L3 m) - 23 m]
Four-port	100 ft. (30 m)	0.16 oz [(L1 ft + L2 ft + L3 ft + L4 ft) - 100 ft] 0.005 kg [(L1 m + L2 m + L3 m + L4 m) - 30 m]
Five-port	125 ft. (38 m)	0.16 oz [(L1 ft + L2 ft + L3 ft + L4 ft + L5 ft) - 125 ft] 0.005 kg [(L1 m + L2 m + L3 m + L4 m + L5 m) - 38 m]

# 17. Single and Multi-Zone Outdoor Control Connections

## Inverter Outdoor PCB

### 24K Mono Main PCB

Port	Description	Voltage
CN1	Power output for 4-way valve	230V/AC
CN6	Power output for compressor heater	230V/AC
CN3	Port for L-in	230V/AC
CN9	Power output for chassis heater	230V/AC
CN4	Port for N-in	
CN29	N-out for IPM board	
CN37	L-out for IPM board	230V/AC
CN28	Port for communication with indoor unit	
CN26	Port for test board	5V/DC
CN21	Communication with IPM board	12V, 5V/DC
CN7	Power output for discharge (T5) temperature sensor	5V/DC
CN18	Power output for EEV	12V/AC

PCB Code: 17122300001076

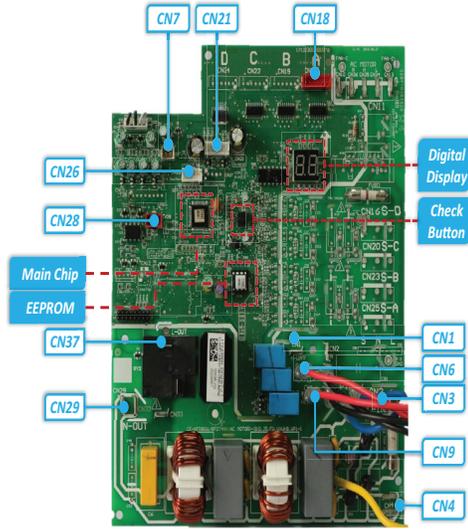


Figure 24. Typical Component Locations (MLB018S4M-1P, MPC024S4M-1P, MPC018S4M-2P, and MPC036S4M-1P)

# Inverter Outdoor PCB

PCB Code: 17122000048064

18K/24K (Gas cooler) Alt.

Port	Description	Voltage
CN23	Port for test board	5V/DC
CN414	Port for DC fan	0-310V/AC
CN17	Power output for condenser (T3), ambient (T4) and discharge (Tp) temperature sensors	5V/DC
CN18	Power output for EEV	12V/DC
CN19	Power output for chassis heater	230V/AC
CN5	Power output for AC fan	230V/AC
CN16	Power output for compressor heater	230V/AC
CN60	Power output for 4-way valve	230V/AC
CN3	Port for power cable (E,N,L,S)	
CN27	Port for Compressor	0-310V/AC

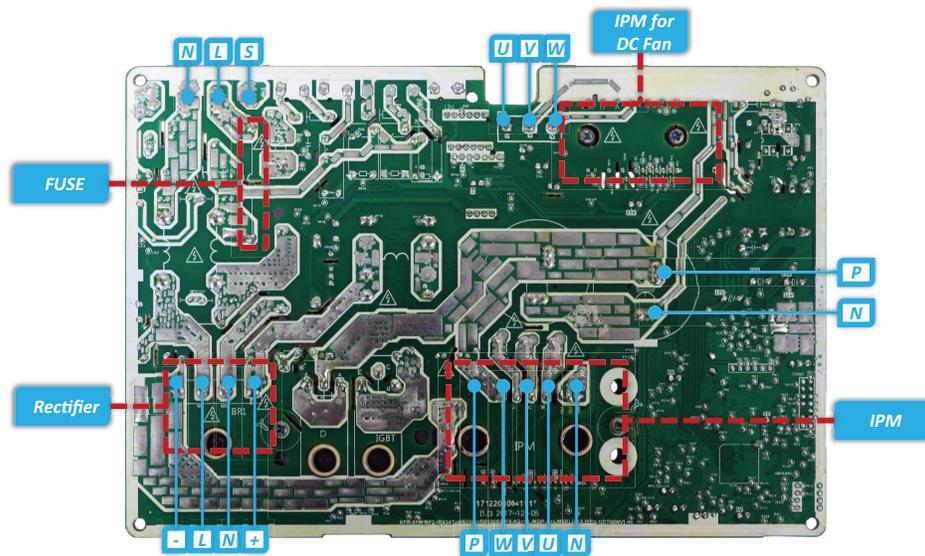
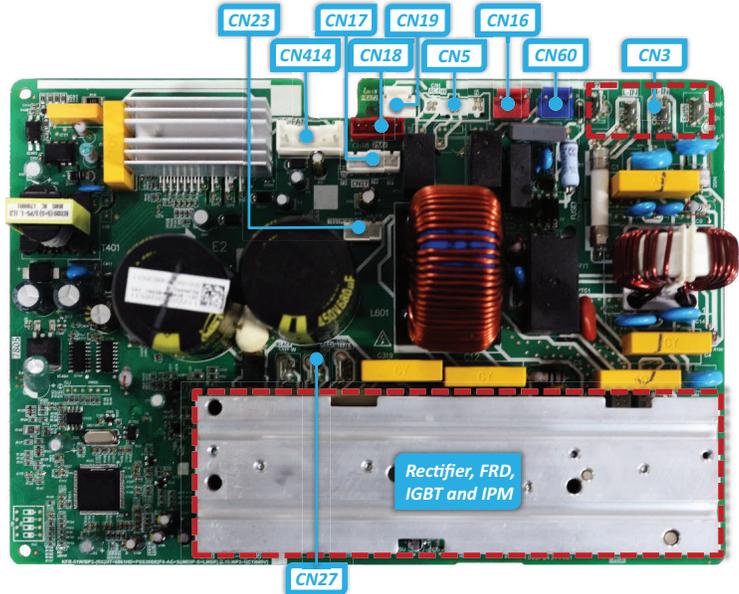


Figure 25. Typical Component Locations (MPC018S4S-1P and MPC024S4S-1P)

(Single Phase, Gas Cooler) Mono and Multi

PCB Code:  
17122000042012



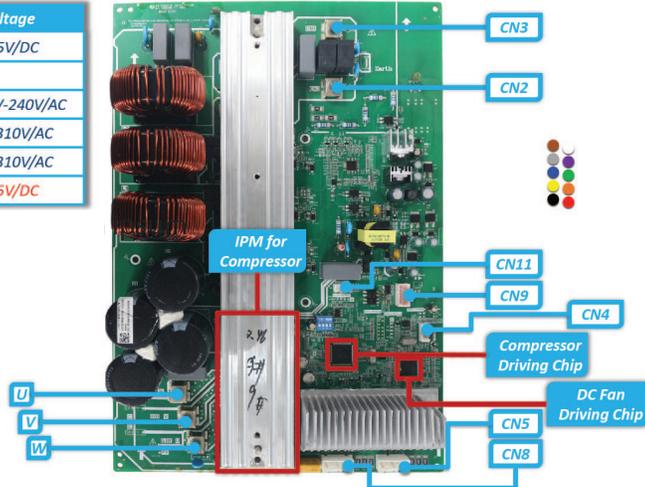
PCB Code:  
17122000037804



(Single Phase, Gas Cooler) IPM Board

PCB Code: 17122000042012

Port	Description	Voltage
CN9	Communication port with main board	5V/DC
CN3	N-in	
CN2	L-in	220V-240V/AC
CN5, CN8	Ports for DC fan motor	0-310V/AC
U, V, W	Output for compressor	0-310V/AC
CN4, CN11	Port for test board	5V/DC



48K (Single Phase, Gas Cooler) Mono Main Board

PCB Code:  
17122000037804

Port	Description	Voltage
CN1, 3	Power input of the PCB	230V/AC
CN2, 4	Power output for IPM board	230V/AC
CN22	Port for communication with indoor unit	
CN35	Port for test board	5V/DC
CN6	Port for communication with IPM board	5V/DC
CN9	Power output for condenser (T3), ambient (T4) temperature sensors	5V/DC
CN8	Power output for discharge (Td) temperature sensor	5V/DC
CN15	Power output for EEV	12V/DC
CN10	Port for Hi-pressure and low-pressure switches	
CN17	Power output for 4-way valve	230V/AC
CN24	Power output for compressor heater	230V/AC
CN19	Power output for chassis heater	230V/AC
CN12	Power output for IPM heat sink (TH) temperature sensor	5V/DC

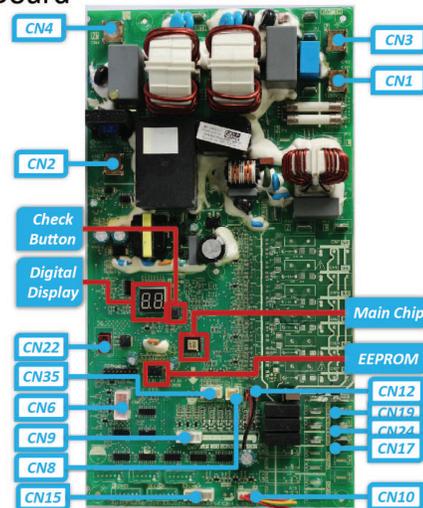


Figure 26. Typical Component Locations (MLB048S4S-2P, MLB036S4S-2P, MLB048S4S-1P, MLB036S4S-1P, MLB048S4M-2P, MPC048S4S-1P and MPC060S4S-1P)

# Inverter Outdoor PCB

18K/24K (Gas cooler)

PCB Code: 17122000041117

Port	Description	Voltage
CN23	Port for test board	5V/DC
CN414	Port for DC fan	0-310V/AC
CN17	Power output for condenser (T3), ambient (T4) and discharge (Tp) temperature sensors	5V/DC
CN18	Power output for EEV	12V/DC
CN19	Power output for chassis heater	230V/AC
CN5	Power output for AC fan	230V/AC
CN16	Power output for compressor heater	230V/AC
CN60	Power output for 4-way valve	230V/AC
CN3	Port for power cable (E,N,L,S)	
CN21	Port for Compressor	0-310V/AC

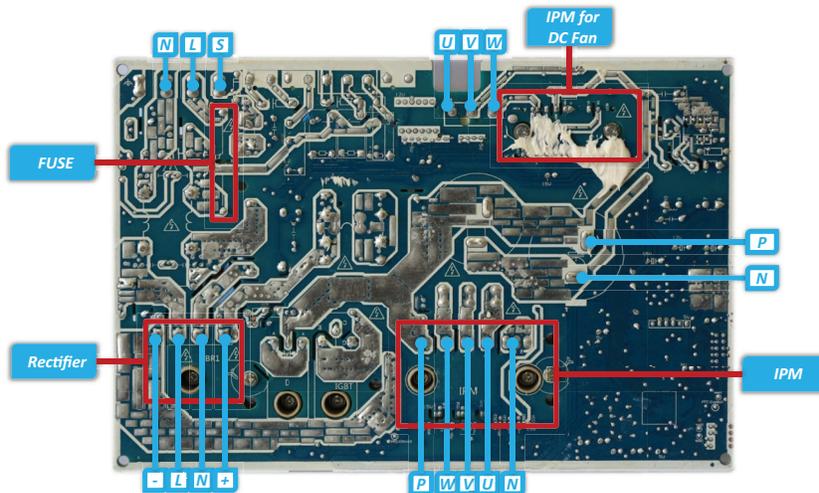
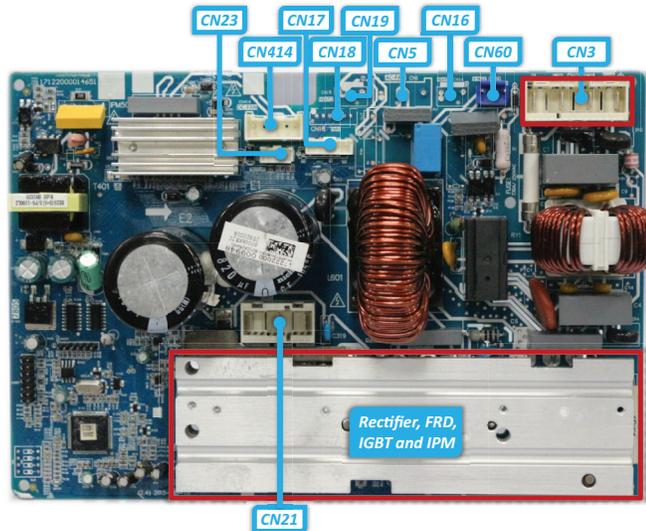


Figure 27. Typical Component Locations (MLB018S4S-1P)

## 24K/36K (1 Phase, New Gas-cooler) Main PCB

PCB Code:  
17122000047742

Port	Description	Voltage
CN24	Port for test board	5V/DC
CN27	Communication port with key board	
CN30	Port for OLP (Compressor top)	
CN28	Port for Hi-pressure and low-pressure switches	
CN42	Power for heatsink (TF) temperature sensor	5V/DC
CN26	Power output for condenser (T3), ambient (T4) and discharge (Tp) temperature sensors	5V/DC
CN16	Power output for EEV	12V/DC
CN11, 12	Port for power cable (N, L)	230V/AC
CN38	Power output for 4-way valve	230V/AC
CN21	Power output for chassis heater	230V/AC
CN20	Power output for compressor heater	230V/AC
CN32	Port for DC fan	0-310V/AC
UVW	Port for Compressor	0-310V/AC

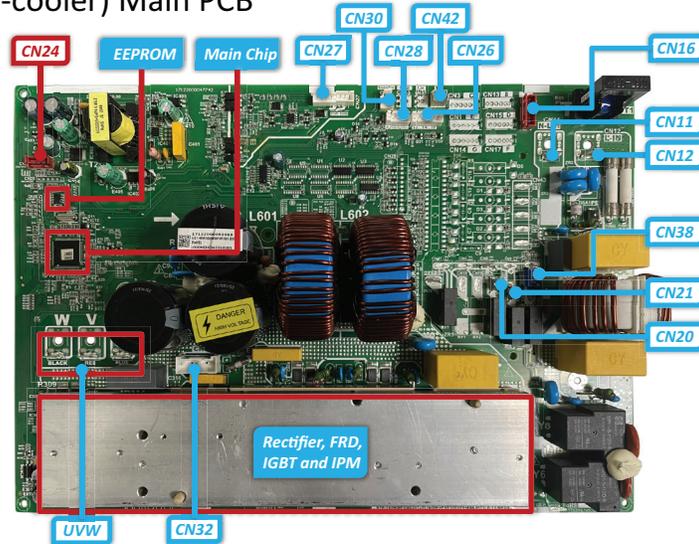


Figure 28. Typical Component Locations (MPC036S4S-1P and MLB024S4S-1P)

## X4 Multi Main PCB

PCB Code: 17122000051368

Port	Description	Voltage
CN23	Port for DC fan	0-310V/AC
CN24	Port for test board	5V/DC
CN29	Port for Hi-pressure and low-pressure switches	
CN30	Port for OLP (Compressor top)	
CN26	Power output for condenser (T3), ambient (T4) and discharge (Tp) temperature sensors	5V/DC
CN28	Communication port with key board	
CN15, 3, 13, 10	Power output for EEVs	12V/DC
CN38	Power output for 4-way valve	230V/AC
CN4, 2, 43, 5	Communication ports with indoor units	
CN11, 12	Port for power cable (N, L)	230V/AC
CN21	Power output for chassis heater	230V/AC
CN8	Power output for compressor heater	230V/AC
CN27	Power output for evaporator outlet (T2B) temperature sensors	5V/DC
UVW	Port for Compressor	0-310V/AC

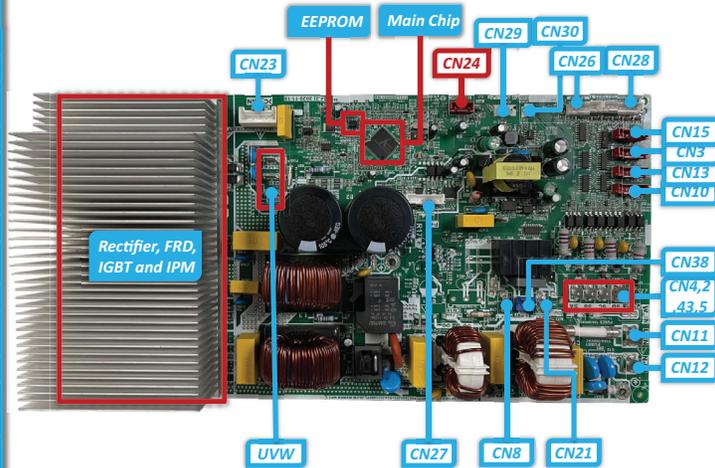


Figure 29. Typical Component Locations (MPC018S4M-1P)

## 18. Specifications and Operations

**Table 2. Electronic Functions Abbreviations**

T1	Indoor ambient temperature
T2	Coil temperature of indoor heat exchanger
T2B	Coil temperature of indoor heat exchanger outlet. (Located in outdoor unit)
T3	Pipe temperature of outdoor heat exchanger
T4	Outdoor ambient temperature
T5	Compressor discharge temperature

**Table 3. Electronic Control Working Environment**

Input voltage: 230V
Input power frequency: 60Hz
Indoor fan normal working amp. is less than 1A
Outdoor fan normal working amp is less than 1.5A
Four-way valve normal working amp is less than 1A

**Table 4. Main Protection**

Three minutes delay at restart for compressor
One minute delay for the first time start-up and three minutes delay for others
Temperature protection of compressor discharge
When the compressor discharge is getting higher, the running frequency will be limited as below rules:
If 215.6°F (102°C) < T5 < 244.4°F (115°C), decrease the frequency to the lower level every two minutes until to F1.
If T5 < 244.4°F (115°C) for ten seconds, the compressor will stop and restart till T5 < 194°F (90°C)

**Table 5. Indoor/Outdoor Units Communication Protection**

If the indoor units cannot receive the feedback signal from the outdoor units for two minutes, the unit will stop and display failure.	
High Condenser Col Temp Protection	When T3>149°F (65°C) for three seconds, the compressor will stop while the indoor fan and outdoor fan will continue.
	When T3<125.6°F (52°C), the protection will release and the compressor will restart after three minutes.
Outdoor Unit Anti-Freezing Protection	When T2B< 32°F (0°C) for 250 seconds, the indoor unit capacity demand will be zero and resume to normal when T2B> 50°F (10°C).
Running Rules	1. If the compressor frequency keeps lower than RET_OIL_FREQ1_ADD for RET_OIL_TIME1_ADD, the AC will rise the frequency to RET_OIL_FREQ2_ADD for RET_OIL_TIME2_
	2. During the oil return process, the EXV will keep 300p while the indoor units will keep the current running mode.

**Table 6. Compressor Preheating Functions**

Preheating permitting condition	If T4 (outdoor ambient temperature)< 37.4°F (3°C) and newly powered on or if T4<37.4°F (3°C) and compressor has stopped for over 3 hours, the compressor heating cable will work.
Preheating Mode	A weak current flow through the coil of compressor from the wiring terminal of compressor, then the compressor is heated without operation.
Preheating Release Condition	If T4>41°F (5°C) or the capacity demand isn't zero, preheating function will stop.

**Table 7. Compressor Crankcase Heater**

Preheating permitting condition	When T4 < 37.4°F (3°C) within 5 seconds of being plugged in, the crankcase heater will be active.
	When T4 < 37.4°F (3°C) and the compressor is not running for 3 hours, the crankcase heater will be active.
Preheating Release Condition	If T4>41°F (5°C) or the indoor has capacity demand, the crankcase heater will stop work.

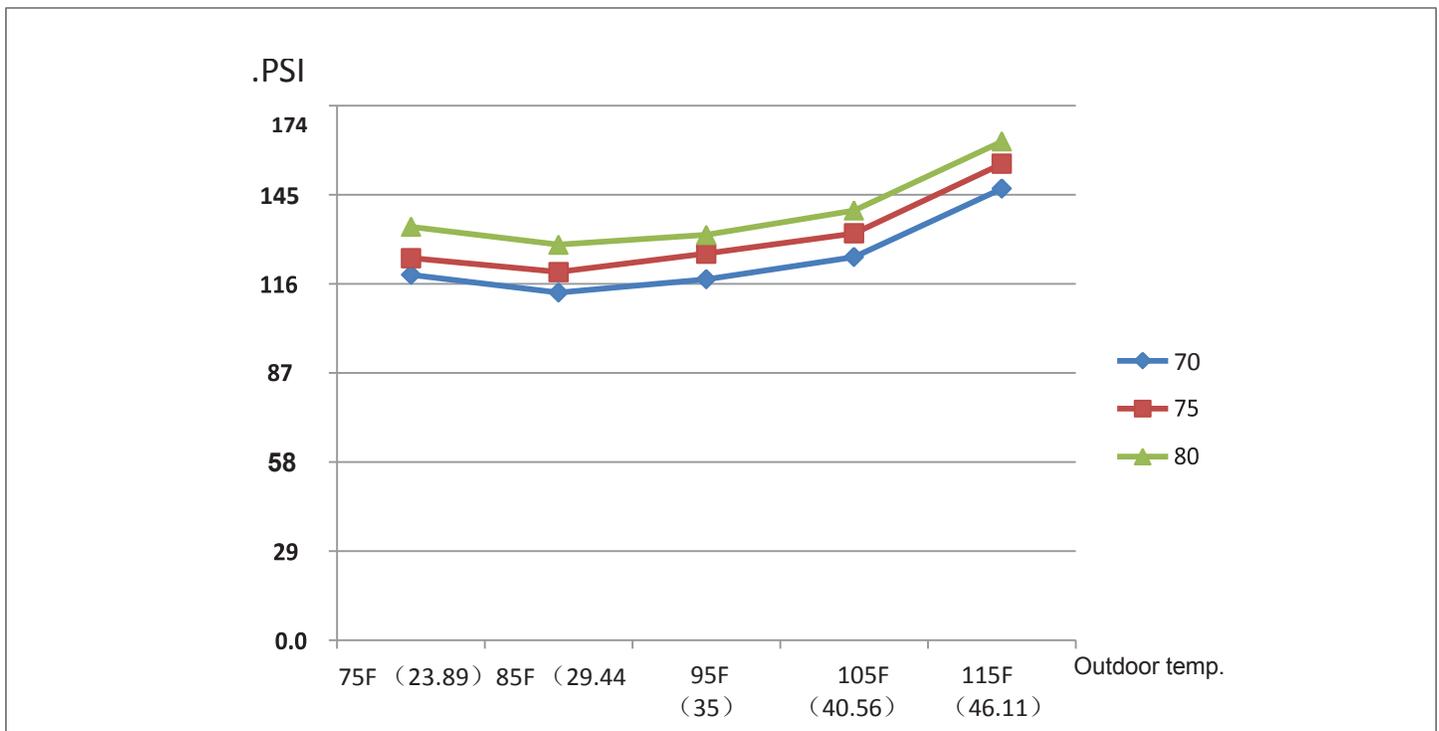
## 19. Pressure on Service Port

### 19.1. Cooling Charts

#### 19.1.1. Cooling Mode

Table 8. Cooling Charge - Cooling Mode						
°F	Indoor Temp.	Outdoor temp.				
		75	85	95	105	115
(°C)		(23.89)	(29.44)	(35)	(40.56)	(46.11)
PSI	70	119	113	117	125	147
PSI	75	124	120	126	132	155
PSI	80	135	129	132	140	162

#### 19.1.2. Pressure (PSI)

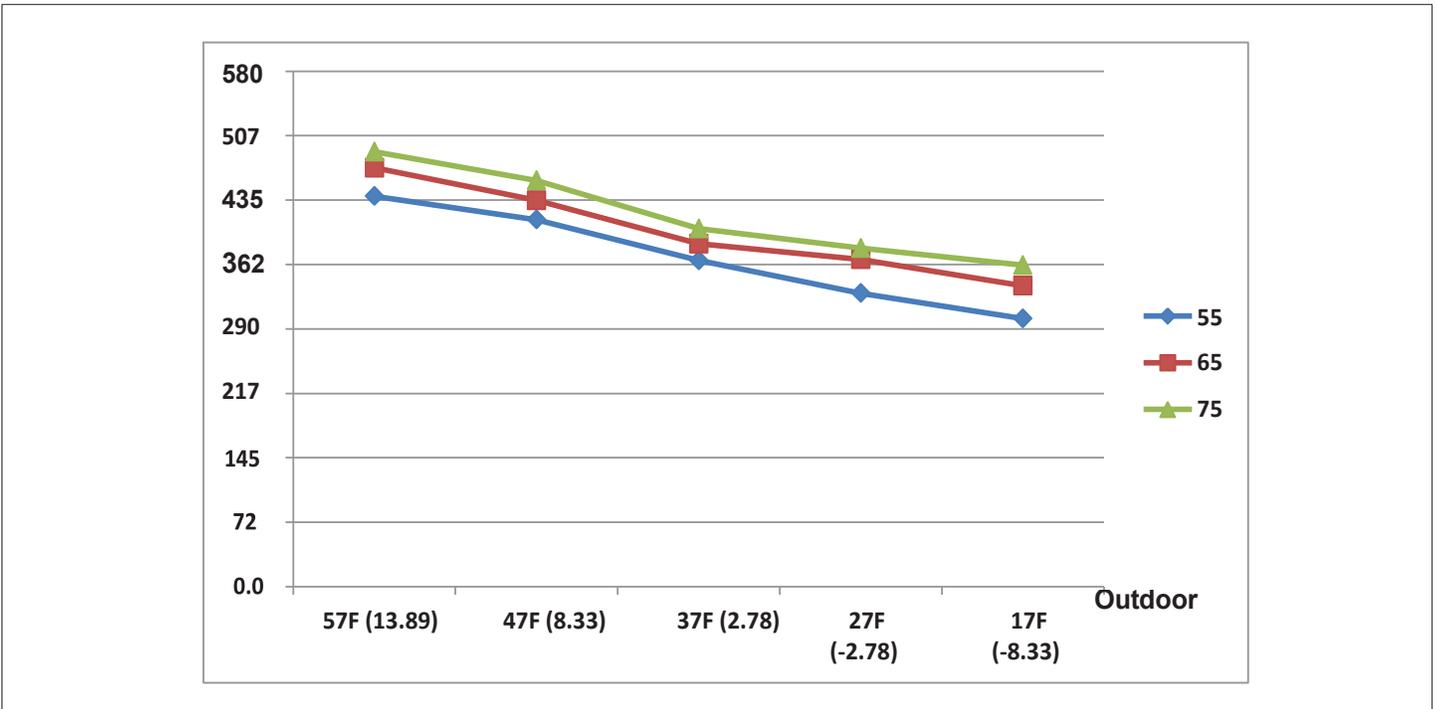


### 19.2. Heating Chart

#### 19.2.1. Heating Mode

Table 9. Heating Charge - Heat Mode						
°F	Indoor Temp.	Outdoor temp.				
		57	47	37	27	17
(°C)		57 (13.89)	7 (8.33)	-2.78	(-2.78)	(-8.33)
PSI	55	439	413	367	330	302
PSI	65	471	435	386	368	339
PSI	75	489	457	403	381	362

### 19.2.2. Pressure (PSI)



### 19.3. Capacity Request Calculations

Total capacity Request =  $\Sigma(\text{Norm code} \times \text{HP}) / 10 \times \text{modify rate} + \text{correction}$ .

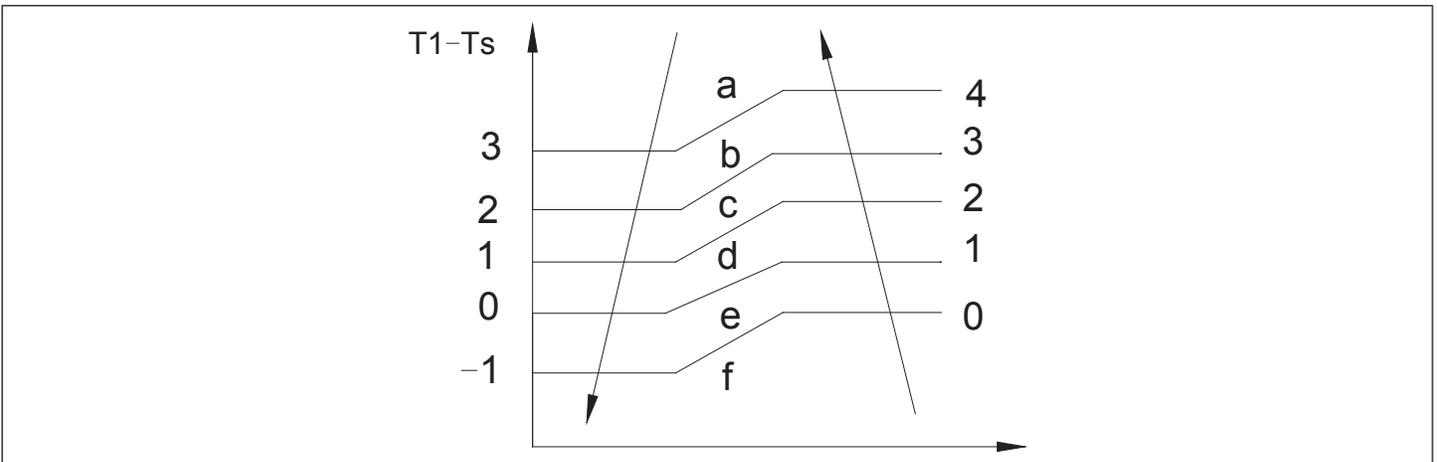


Figure 30. Cooling Mode

Capacity Area	a	b	c	d	e	f
Norm Code (N)	3	2	1.5	1	.5	0

Model	6K	9K	12K	18K	24K	30K	36K
HP	0.8	1.0	1.2	1.5	2.5	3.2	4.0

**NOTE:** The final result is integer.

Plus all the indoor capacity request together, then modify it by T4.

When there is only one indoor unit:

Cooling	Outdoor Temperature (T4)		
	>29°C	18°C to 29°C	<17°C
	>84.2°F	64.4°F to 84.2°F	<62.6°F
Modify Rate	100%	60%	40%

When there is more than one indoor unit:

Cooling	Outdoor Temperature (T4)		
	>25°C	17°C - 25°C	<17°C
	>77°F	62.6°F - 77°F	<62.6°F
Modify Rate	100%	80%	40%

**NOTE:** The final result is integer.

In low ambient cooling mode, modify rate is fixed as 40%.

According to the final capacity request to confirm the operating frequency, as following table.

Frequency (Hz)	0	COOL_ F1_	COOL_ F2_	...	COOL_ 15_	COOL_ 16_
Amendatory capacity demand	0	1	2	...	15	16

Meanwhile the maximum running frequency will be adjusted according to the outdoor ambient temp.

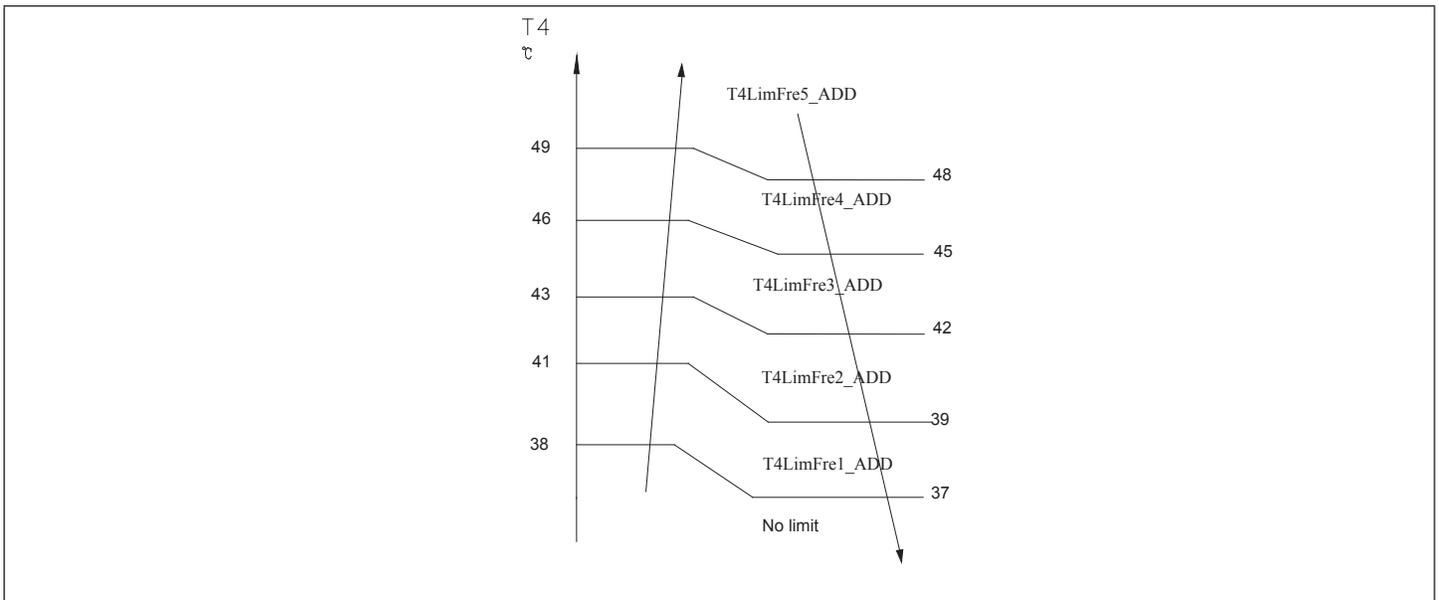
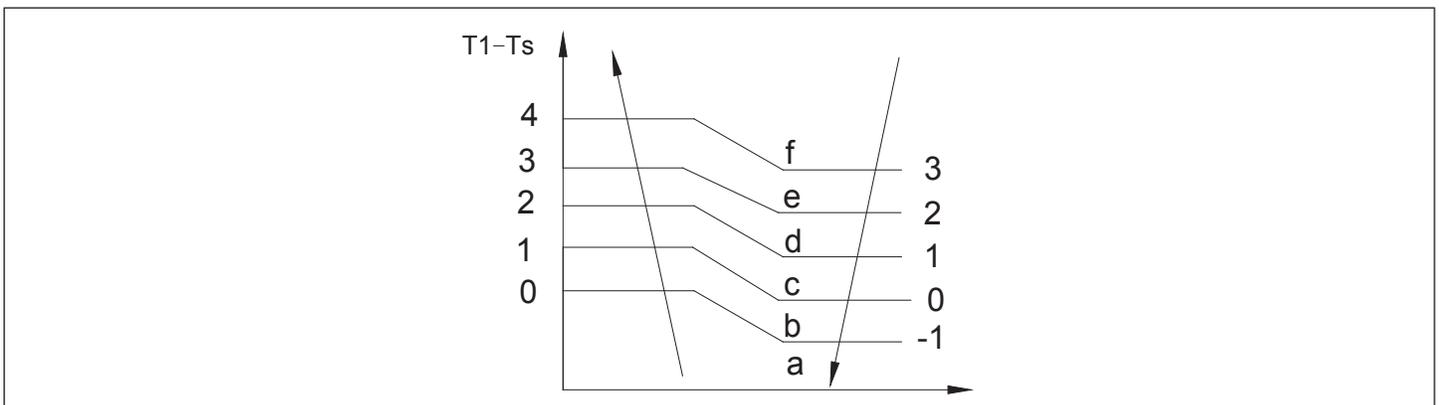


Figure 31. Heating Mode

## 19.4. Heating Mode

Plus all the indoor capacity request together, then multiply it by T4.

When there is only one indoor unit:



Capacity Area	a	b	c	d	e	f
Norm Code (N)	3	2	1.5	1	.5	0

Model	6K	9K	12K	18K	30K	36K
HP	0.8	1.0	1.2	1.5	2.5	4.0

Outdoor Temperature (T4)				
Heating	<0°C	<12°C	12°C to 17°C	≥17°C
	<32°F	<53.6°F	53.6°F to 77°F	≥62.6°F
Modify Rate	120%	80%	40%	20%

When there more than one indoor unit:

Outdoor Temperature (T4)				
Heating	<0°C	<12°C	12°C to 17°C	≥17°C
	<32°F	<53.6°F	53.6°F to 62.6°F	≥62.6°F
Modify Rate	120%	100%	80%	60%

**NOTE:** The final result is integer.

Then modify it according to T2 average (correction).

**NOTE:** Average value of T2: Sum T2 value of all indoor units/ (indoor units number). According to the final capacity request to confirm the operating frequency, as following table. Heating capacity improved in low ambient heating.

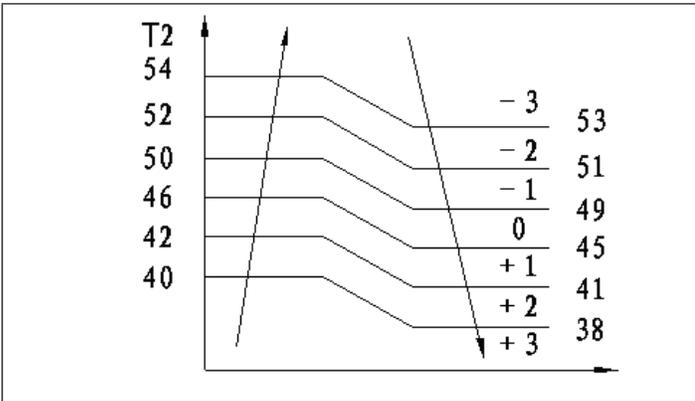
In heating mode, when  $T2 < T2\_ExitT4LowFre\_ADD$ , and  $T4 < -4°C$ , there is frequency elevation: elevated frequency = Recent frequency \* 110%

When  $T2 > T2\_ExitT4LowFre\_ADD - 2$  and  $T4 > -6$ , the highest frequency can't exceed F17

When  $T2 > T2\_ExitT4LowFre\_ADD - 4$  and  $T4 > -8$ , the highest frequency can't exceed F18

When  $T2 > T2\_ExitT4LowFre\_ADD - 6$  and  $T4 > -10$ , the highest frequency can't exceed F19

In the other conditions, the highest frequency is F20.



Frequency (Hz)	0	HEAT_ F1	HEAT_ F2	...	HEAT_ 15	HEAT_ 16
Amendatory capacity demand	0	1	2	...	15	16

## 19.5. Defrost Control

For defrost calculations:

- T3 = Outdoor coil temperature sensor.
- T30 = Minimum value of T3 during 10 to 15 minutes of run-time period.

Defrost mode begins when any one of the following conditions are met:

- After 29 minutes of run-time -  $T3 < 19.4^{\circ}\text{F}$  ( $-7^{\circ}\text{C}$ ) and  $T3 + 4.5^{\circ}\text{F}$  ( $2.5^{\circ}\text{C}$ )  $\leq T30$ .
- After 35 minutes of run-time -  $T3 < 23^{\circ}\text{F}$  ( $-5^{\circ}\text{C}$ ) and  $T3 + 5.4^{\circ}\text{F}$  ( $3^{\circ}\text{C}$ )  $\leq T30$ .
- After 40 minutes of run-time -  $T3 < -11.2^{\circ}\text{F}$  ( $-24^{\circ}\text{C}$ ) for three minutes.
- After 120 minutes of run-time -  $T3 < 5^{\circ}\text{F}$  ( $-15^{\circ}\text{C}$ ).

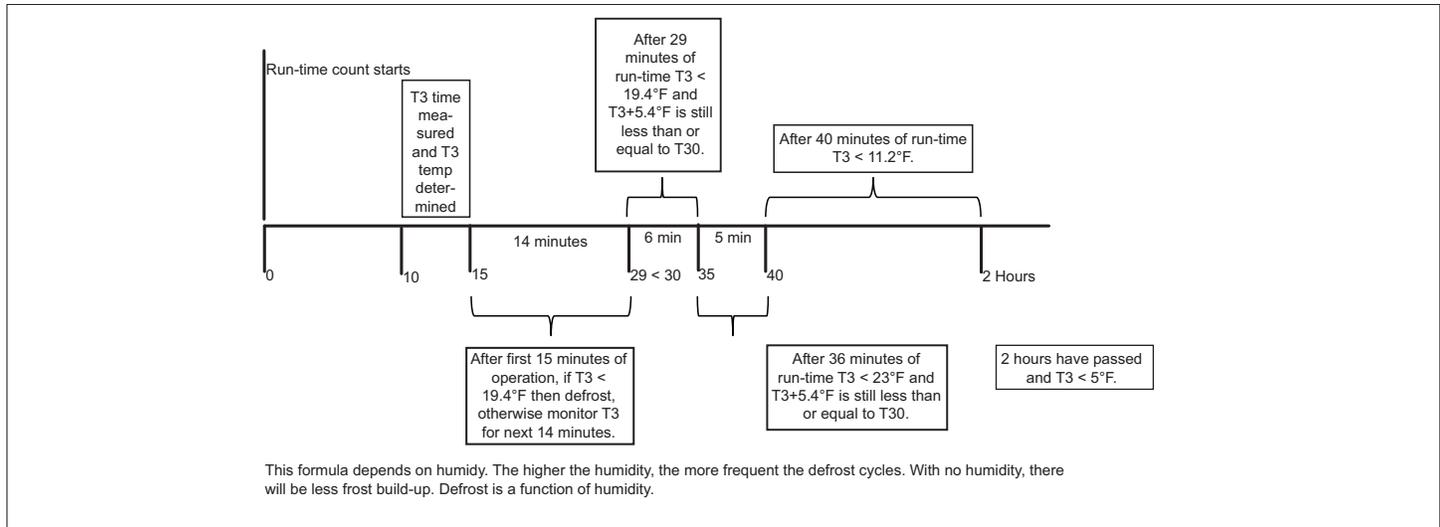


Figure 32. Defrost Calculations

## 19.6. Defrost Theory

**Tdef** = The unit must run for a minimum of 11 minutes or longer in order for it to go into defrost mode. At that time it will look at one of the following five conditions to determine when to go into defrost. Those conditions are:

- **Condition 1:** After 29 minutes of accumulated run-time: Coil temperature  $\leq 19.4^{\circ}\text{F}$  and coil temperature  $\leq T_{\text{def}} - 5.4^{\circ}\text{F}$ .
- **Condition 2:** After 35 minutes of accumulated run-time: Coil temperature  $\leq 23^{\circ}\text{F}$  and coil temperature  $\leq T_{\text{def}} - 2.7^{\circ}\text{F}$ .
- **Condition 3:** After 40 minutes of accumulated run-time: Coil temperature  $\leq 10^{\circ}\text{F}$  for three minutes.
- **Condition 4:** After 120 minutes of accumulated run-time: Coil temperature  $\leq 5^{\circ}\text{F}$ .
- **Condition 5:** If T3 is less than  $37^{\circ}\text{F}$  after 120 minutes of continuous run-time and T3 is less than  $27^{\circ}\text{F}$  for three minutes, it will start defrost.

**NOTE:** T3 = Outdoor Coil Sensor

## 19.7. Defrost Termination

If any of the following conditions are met, the unit will exit defrost mode and return to normal heating mode.

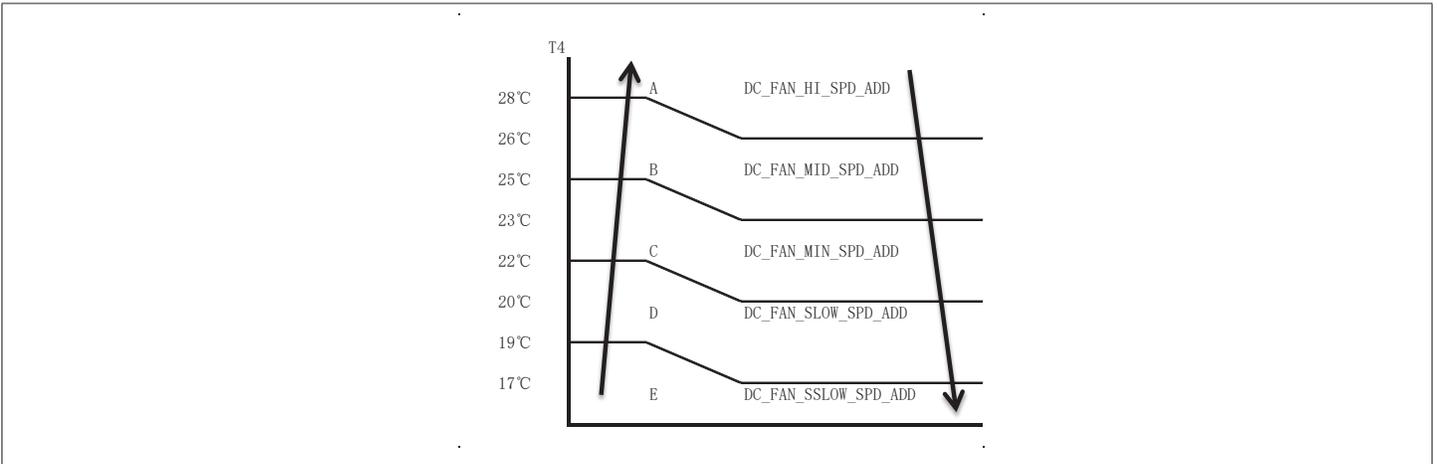
- **Condition 1:** Coil temperature is higher than  $70^{\circ}\text{F}$ .
- **Condition 2:** Coil temperature is higher than  $55^{\circ}\text{F}$  for continuous 80 seconds.
- **Condition 3:** Defrost run-time of 10 minutes.

This also includes any manual defrost update by using a remote control.

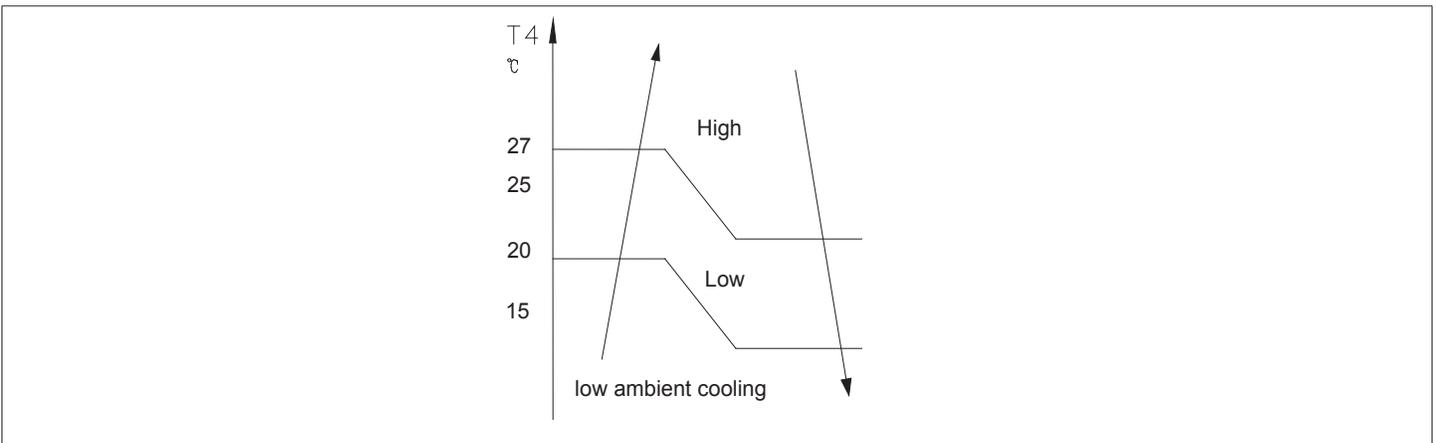
## 19.8. Outdoor Fan Control

### 19.8.1. Cooling Mode

Normally the system will choose the running fan speed according to ambient temperature:



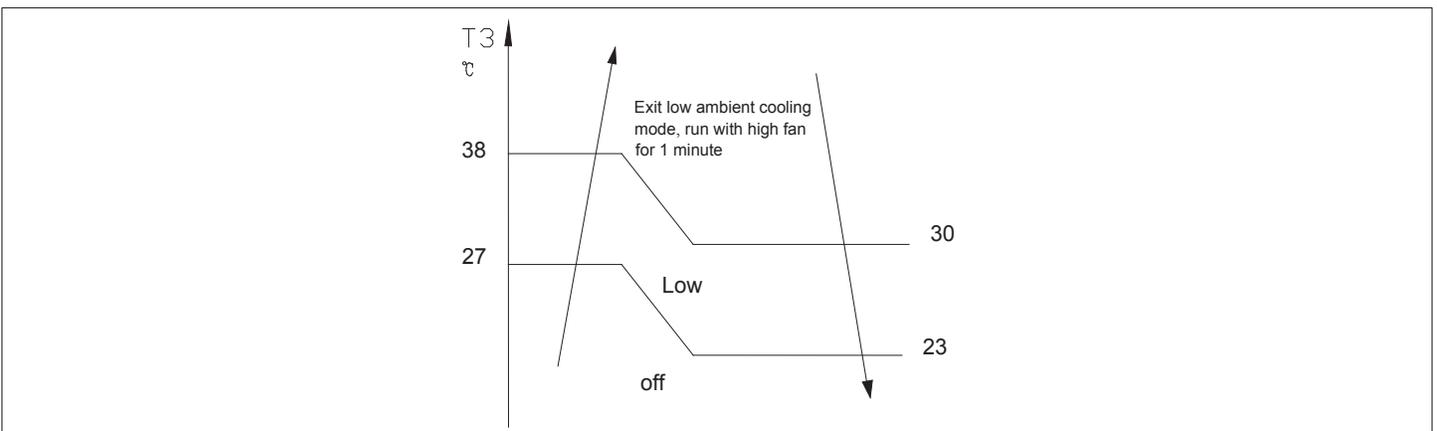
When low ambient cooling is valid:



Outdoor fan speed control logical (low ambient cooling).

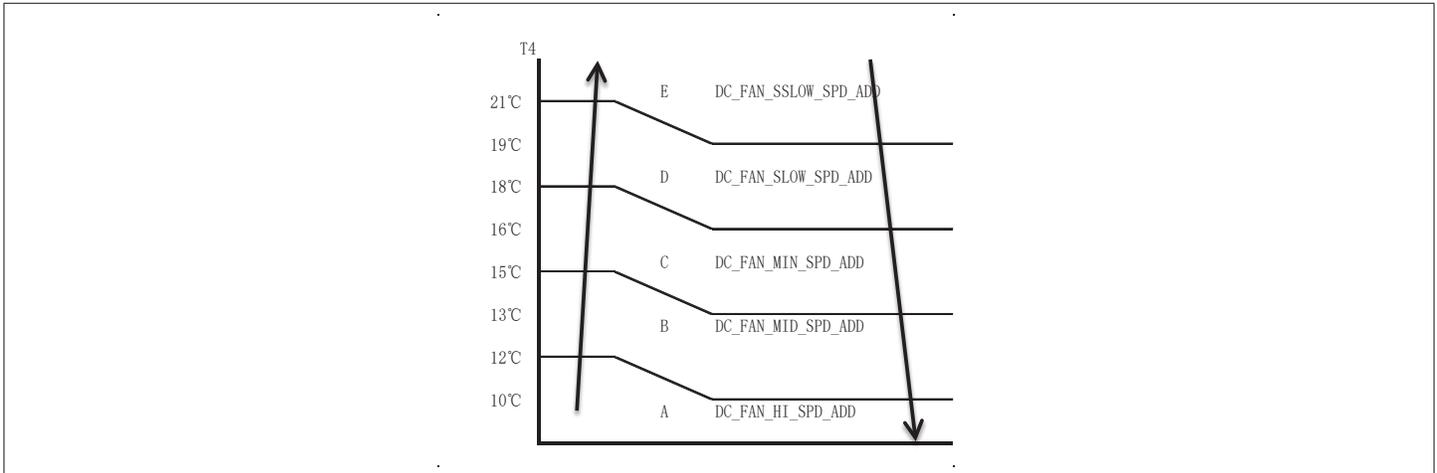
When  $T4 < 15^{\circ}\text{C}$  ( $59^{\circ}\text{F}$ ) and  $T3 < 30^{\circ}\text{C}$  ( $86^{\circ}\text{F}$ ), the unit will enter into low ambient cooling mode. The outdoor fan will choose speed according to  $T3$ .

When  $T3 \geq 38^{\circ}\text{C}$  ( $100.4^{\circ}\text{F}$ ) or when  $T4 \geq 20^{\circ}\text{C}$  ( $68^{\circ}\text{F}$ ), the outdoor fan will choose the speed according to  $T4$  again.



## 19.8.2. Heating Mode

Normally the system will choose the running fan speed according to ambient temperature:



## 19.9. Four-Way Valve Control

In heating mode, four-way valve is opened. In defrosting, four-way valve operates according to defrosting action. In other modes, four-way valve is closed. When the heating mode to other modes, the four-way valve is off after compressor is off for 2 minutes. Failure or protection (not including discharge temperature protection, high and low pressure protection), four-way valve immediately shuts down.

## 19.10. Electronic Expansion Valve (EXV) Control

- EXV will be fully closed when turning on the power. Then EXV will be standby with 350P open and will open to target angle after compressor starts.
- EXV will close with -160P when compressor stops. Then EXV will be standby with 350P open and will open to target angle after compressor starts.
- The action priority of the EXVs is A-B-C-D.
- Compressor and outdoor fan start operation only after EXV is initialized.

### 19.10.1. Cooling mode

The initial open angle of EXV is 250P, adjustment range is 100-350p. When the unit operates for three minutes, the outdoor will receive indoor units (of capacity demand) T2B information and calculate the average of them. After comparing each indoor's T2B with the average, the outdoor gives the following modification commands: If the  $T2B > \text{average}$ , the relevant valve opens 16p (pulses) more. If the  $T2B = \text{average}$ , the relevant valve's open range remains; If the  $T2B < \text{average}$ , the relevant valve closes 16p (pulses) more.

This modification will be carried out every 2 minutes.

### 19.10.2. Heating mode

The initial open angle of EXV is 250P, adjustment range is 100-350p. When the unit start to work for 3 minutes, the outdoor will receive indoor units (of capacity demand) T2 information and calculate from subject received, size and categories.

After comparing each indoor's T2 with the average, the outdoor gives the following modification commands: If the  $T2 > \text{average} + 2$ , the relevant valve needs closes 16p (pulses) more.

If  $\text{average} + 2 \geq T2 \geq \text{average} - 2$ , the relevant valve's open range remains.

If the  $T2 < \text{average} - 2$ , the relevant valve opens 16p (pulses) more.

This modification will be carry out every 2 minutes.

## 20. Error Codes

The error code display is located on the main controller board of all multi-zone outdoor units.

**Table 10. MLB and MPC Multi-Zone Outdoor Unit Error Codes**

Display	Malfunction and Protection Indication
EL01	Communication malfunction between indoor and outdoor units.
FL14	Capability mismatch between indoor unit and outdoor unit
EC50	Outdoor temperature sensor error.
EC51	Outdoor EEPROM error.
EC52	Condenser coil temperature sensor (T3) malfunction.
EC53	Outdoor ambient temperature sensor (T4 ) malfunction.
EC54	Compressor discharge temperature sensor TP is in open circuit or has short circuited
EC55	Outdoor IPM module temperature sensor malfunction
EC56	Outdoor T2B sensor error.
EC57	Refrigerant pipe temperature sensor error.
EC07	Outdoor DC fan motor malfunction/fan speed out of control.
EC71	Over current failure of outdoor DC fan motor.
EC72	Lack phase failure of outdoor DC fan motor.
PC00	Inverter module (IPM) protection.
PC02	Top temperature protection of compressor.
PC06	Discharge temperature protection of compressor.
PC08	Outdoor over-current protection.
PC0A	High temperature protection of condenser.
PC0F	PFC module protection.
PC0L	Low temperature protection of outdoor unit.
PC10	Outdoor unit low AC voltage protection.
PC11	Outdoor unit main control board DC bus high voltage protection.
PC12	Outdoor unit main control board DC bus high voltage protection / 341 Machine Check Error (MCE) error.
PC30	System high pressure protection
PC31	System low pressure protection

**Table 10. MLB and MPC Multi-Zone Outdoor Unit Error Codes**

Display	Malfunction and Protection Indication
PC40	Communication error between outdoor main chip and compressor driven chip
PC42	Compressor start failure of outdoor unit
PC43	Outdoor compressor lack phase protection
PC44	Outdoor unit zero speed protection
PC45	Outdoor unit IR chip drive failure
PC46	Compressor speed has been out of control
PC49	Compressor over-current failure
PCA1	Condensation protection of refrigerant pipe
PH90	High temperature protection of Evaporator
PH91	Low temperature protection of Evaporator
LC06	High temperature protection of Inverter module (IPM)







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