

Please read this manual carefully before installation and keep it for future reference.

Owner's Manual



MRCOOL®

COMFORT MADE SIMPLE

Universal® Series
Air Handler

Model - MDUI180**

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

Version Date: 10-25-21

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

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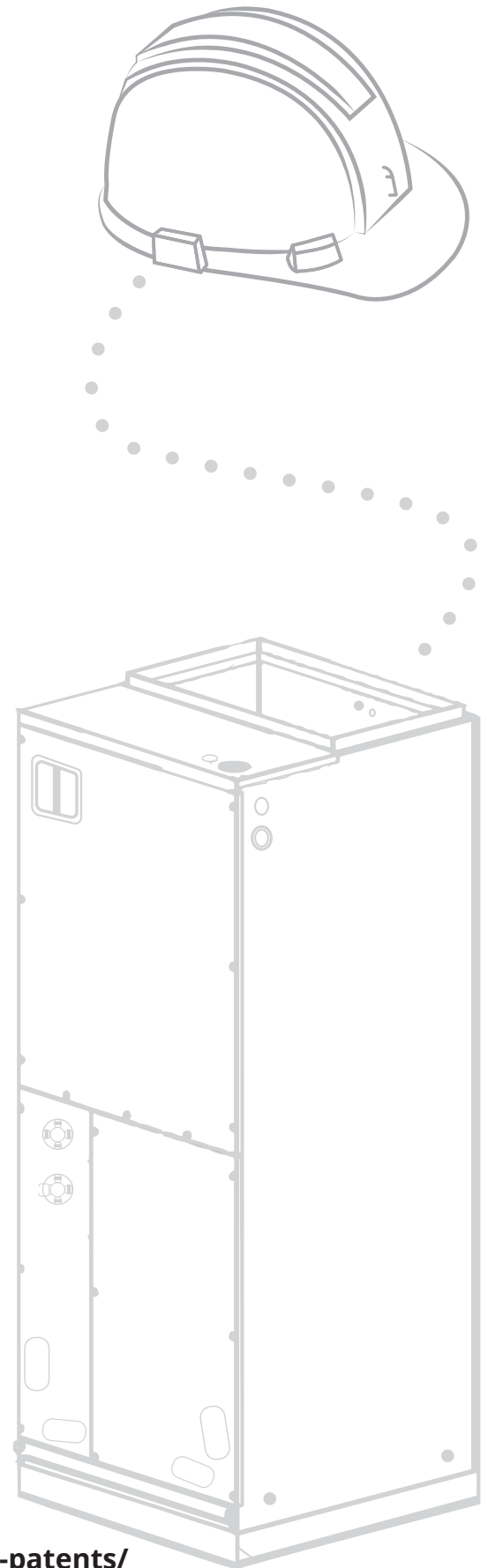
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*Pat. <https://mrcool.com/mrcool-patents/>

Safety Precautions



Read Before Installation

Incorrect installation may cause serious damage or injury.

The seriousness of potential damage or injuries is classified as either a **WARNING** or **CAUTION**.



WARNING

This symbol indicates ignoring instructions may cause death or serious injury.



CAUTION

This symbol indicates that ignoring instructions may cause moderate personal injury, damage to your unit, or other property.



This symbol indicates that you should **NEVER** perform the indicated action.



WARNING

Please read the manual in its entirety before installing, operating or repairing.

- ① ***DO NOT*** share the electrical circuit with other appliances. Improper or insufficient power supply can cause fire and/or electrical shock.
 - ① ***DO NOT*** allow any substances or gases to enter the unit when connecting refrigerant piping. The presence of other gases or substances will lower the unit's capacity and may cause abnormally high pressure in the operation cycle. This could cause an explosion and/or personal injury.
 - ① ***DO NOT*** connect the ground wire to a gas pipe, water pipe, lightning arrester, or telephone wire.
 - ① ***DO NOT*** allow children to play with the air conditioner. Children should be supervised around the unit at all times.
 - ① ***DO NOT*** alter the settings of the pressure sensor or other protective devices; if short-circuited or modified, fire and/or an explosion could occur.
1. Installation must be performed by an authorized technician. Improper installation may cause water leakage, electrical shock, and/or fire.
 2. Installation must be performed according to installation instructions. Improper installation may cause water leakage, electrical shock, and/or fire.
 3. In North America, installation must be performed in accordance with the requirements of the NEC and CEC (by authorized personnel only). Contact an authorized service technician for repair or maintenance of the unit.
 4. Only use the included accessories and specified parts for installation. Using non-standard parts can cause water leakage, electrical shock, fire, and could cause the unit to fail.
 5. The United States Environmental Protection Agency ("EPA") has issued various regulations regarding the introduction and disposal of refrigerants introduced into this unit. Failure to follow these regulations may harm the environment and can lead to a substantial fine. These regulations may vary due to the passage of laws. A certified technician must perform the installation and service of this product. Should questions arise, contact your local EPA office.



WARNING

6. Install the unit in a firm location that can support the unit's weight. If the installation location cannot support the weight, or the installation is performed improperly, the unit could fall and cause serious injury and/or damage.
7. For all electrical work, follow all appropriate wiring standards, regulations, and the Installation Manual.
8. You must use an independent circuit to supply power. **DO NOT connect other appliances to the same circuit. Insufficient electrical capacity or defects in electrical work can cause electrical shock and/or fire.**
9. Connect electrical cables tightly and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections may overheat, causing fire and/or electrical shock.
10. All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to overheat, which could cause fire and/or electrical shock.
11. In certain functional environments, such as kitchens and server rooms, the use of specially designed air-conditioning units for this purpose is highly recommended.
12. If the power or thermostat wires are damaged, they must be replaced by an authorized technician in order to avoid hazard.
13. This appliance should not be used by children (under the age of 8 years old) or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge unless they have supervision or are given instruction concerning use of the appliance. They should be made to understand the hazards involved with the appliance. Children should not play with the appliance or perform cleaning and/or user maintenance.
14. Turn off the air conditioner and disconnect the power source before cleaning, otherwise electric shock could occur.
15. If installed in a compact space, ensure that there is adequate ventilation in case of leakage. Concentrations of refrigerant gas can lead to an explosion and other hazards.
16. The fixed wires connecting to this appliance must be configured with an all-pole disconnect under voltage class III.
17. Always wear safety glasses, protective clothing, work gloves, and have a fire extinguisher available during installation.
18. Always use a quenching cloth for brazing operations.

Note about Fluorinated Gases:

1. This air-conditioning unit contains R-410A fluorinated gases.
2. The refrigerant gas may not have an odor, so this should not be considered as a means of leak detection.
3. Installation, service, maintenance, and repair of this unit must be performed by a certified technician.
4. Product un-installation and recycling must be performed by a certified technician.
5. If the system has a leak-detection system installed, it should be checked for leaks at least once every 12 months.
6. Keep a record of all leak checks for the lifetime of the unit.

CAUTION

- ⊘ ***DO NOT*** install the unit within 3 feet (1 meter) of combustible materials if the unit is equipped with an auxiliary electric heater.
- ⊘ ***DO NOT*** install the unit in a location that may be exposed to combustible gases. If combustible gas accumulates around the unit, it could cause fire.
- ⊘ ***DO NOT*** operate your air conditioner in a room where it could be exposed to excessive amounts of water, such as a bathroom or laundry room. Too much exposure to water may cause electrical components to short circuit.
- ⊘ ***DO NOT*** put appendages or other objects into the air inlet or return grills.
- ⊘ ***DO NOT*** stop the appliance by directly cutting off the power. Ensure the unit is turned off first.
- ⊘ ***DO NOT*** install the appliance in areas with:
 - oil, smoke, or volatile liquid; as plastic parts may deteriorate, adversely affecting the integrity and functionality of the appliance.
 - corrosive gas; as this may corrode copper piping and welds, adversely affecting the integrity and functionality of the appliance.
- ⊘ ***DO NOT*** force-dry the filter using an open flame or blowers, as this could damage it.
 1. This appliance must be properly grounded during installation, or electrical shock may occur.
 2. Install the drainage piping according to the instructions in this manual. Improper drainage could cause water damage to your home and property.
 3. This appliance must be stored in a well ventilated area that is equal in size to the area specified for operation.
 4. Use proper measures to protect the unit from rodents and other small animals that may damage electrical components, and cause the unit to malfunction.
 5. If wired control (i.e. a wall-mount thermostat) is to be used, it should be connected before powering up the unit, otherwise it may not function properly.
 6. Only use a soft dry cloth, or a slightly wet cloth with neutral detergent, to clean the casing of this appliance.
 7. If the unit has been disconnected from its power source for an extended period of time, before operating the unit in low temperature, connect it to power for 8 hours. If it is to be deactivated for a short time, for example, one night, do not cut off the power (this is to protect the compressor).

To Our Customers;

Thank you for choosing a MRCOOL® home HVAC product. Please read this manual carefully before installation and operation of the Universal™ Series Air Handler to ensure correct use and handling. In addition to the safety precautions in the previous section, please adhere to the following guidelines and note our exceptions to liability.


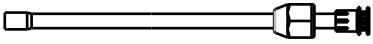
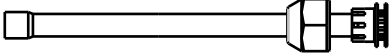
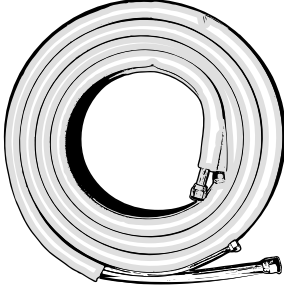
1. This appliance can be used by children aged 8 years and older and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children should not play with the appliance. Cleaning and user maintenance should not be performed by children.
2. To ensure product reliability, the unit may consume power under stand-by status to maintain normal communication, and for preheating refrigerant and lubricant. If the unit will not be used for an extended period, disconnect the power supply. Reconnect the power supply and preheat the unit prior to use.
3. Ensure you have selected the proper model for the operating environment. Improper selection may impact operating performance.
4. This product has undergone strict inspection and operational testing before leaving the factory. To avoid damage due to improper disassembly, which may impact the normal operation, please do not disassemble the unit without proper training and equipment.
5. For technical assistance, please contact MRCOOL® technical support at (270) 366-0457.
6. If the product is malfunctioning and/or is inoperable, please contact MRCOOL® technical support at the aforementioned number, as soon as possible and provide the following information:
 - a. Product Nameplate Contents (model number, cooling / heating capacity, product serial number, factory date)
 - b. Nature of Malfunction (specify the circumstances before and after the error occurred)
7. All illustrations and information in the instruction manual are for reference only. In order to improve the product, we will continuously assess and innovate. We retain the right to make necessary revisions to the product from time to time. We reserve the right to revise the contents of this manual without notice.
8. If the supply cord is damaged, it must be replaced by MRCOOL®, a professional service agent, or a similarly qualified person in order to avoid damage to the product.
9. MRCOOL®, LLC assumes no responsibility for personal injury, property loss or equipment damage caused by improper installation and commissioning, unnecessary maintenance, or failure to follow relevant federal and state regulations, industrial standards, and the requirements of this instruction manual.
10. MRCOOL®, LLC will bear no responsibilities for personal injury or property damage caused by the following:
 - a. Improper use of the appliance
 - b. Altering, maintaining, or operating the product with non-approved equipment.
 - c. Altering, maintaining, or operating the product outside of the guidelines of this manual.
 - d. Defects caused by corrosive gas.
 - e. Defects caused by shipping damage.
 - f. Failure to abide by this instruction manual or government regulations.
 - g. Products made by other manufacturers
 - h. Natural disasters, improper installation environment, or force majeure.


Appliance Overview

The Universal Series® Air Handler offers the perfect combination of superior product quality, operating efficiency, operating sound levels, and value for money. The condensing unit uses the environmentally friendly refrigerant R-410A, which is chlorine-free to help prevent damage to the ozone layer.

Unless otherwise stated (as "OPTIONAL"), the air conditioning system includes the accessories listed below. Use all of the installation parts and accessories to install the air conditioner. Improper installation may result in water leakage, electrical shock, fire, and/or equipment failure.

Accessories

Owner's Manual		<p style="text-align: center;">1</p>
Liquid Side Stub Kit		<p style="text-align: center;">1</p> <p style="text-align: center;">To connect the unit with the liquid pipe</p>
Gas Side Stub Kit		<p style="text-align: center;">1</p> <p style="text-align: center;">To connect the unit with the gas pipe</p>
OPTIONAL No-Vac® Quick Connect® Line Set* Gas / Liquid Pipe Assembly		<p style="text-align: center;">1</p>

Additional Line Sets & Coupler Kit				
	<p>If you find the standard size NO-VAC® QUICK CONNECT® LINE SET* length is not sufficient for your application, additional line sets are available for purchase. You will also need a NO-VAC® COUPLER kit (pictured), which allows line sets to be connected together to increase the length. The coupler kit is installed and checked for leaks by following the same steps described in this manual for connecting the line set to the indoor air handler (Refer to the NO-VAC® QUICK CONNECT® Line Set section on pg. 12 for these steps).</p>			
NO-VAC® QUICK CONNECT® LINE SET Lengths Available	<p style="text-align: center;">15 FT</p>	<p style="text-align: center;">25 FT</p>	<p style="text-align: center;">35 FT</p>	<p style="text-align: center;">50 FT</p>

*Pat. <https://mrcool.com/mrcool-patents/>

Unit Dimensions

MDUI18024/MDUI18036
&
MDUI18048/MDUI18060

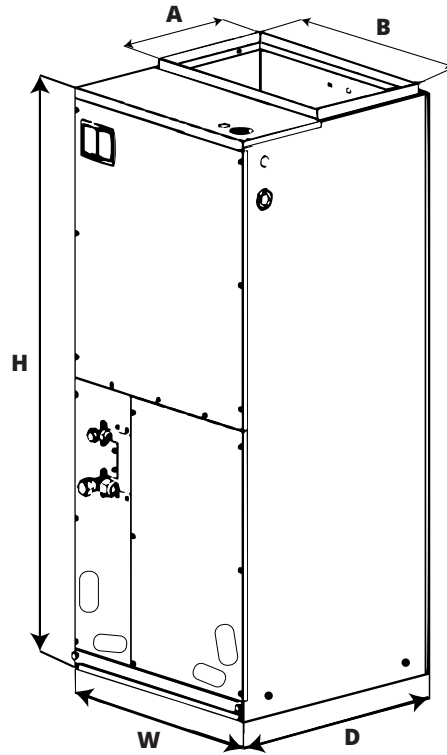


Fig. 1.1

Unit Dimensions: Inches (mm)

Model	Width	Depth	Height	A	B
MDUI18024 & MDUI18036	21-1/4 in (540 mm)	21-1/4 in (540 mm)	48-1/4 in (1224 mm)	11-5/8 in (295 mm)	20 in (508 mm)
MDUI18048 & MDUI18060	24-3/4 in (630 mm)	21-1/4 in (540 mm)	57 in (1448 mm)	11-5/8 in (295 mm)	20 in (508 mm)

Main Parts

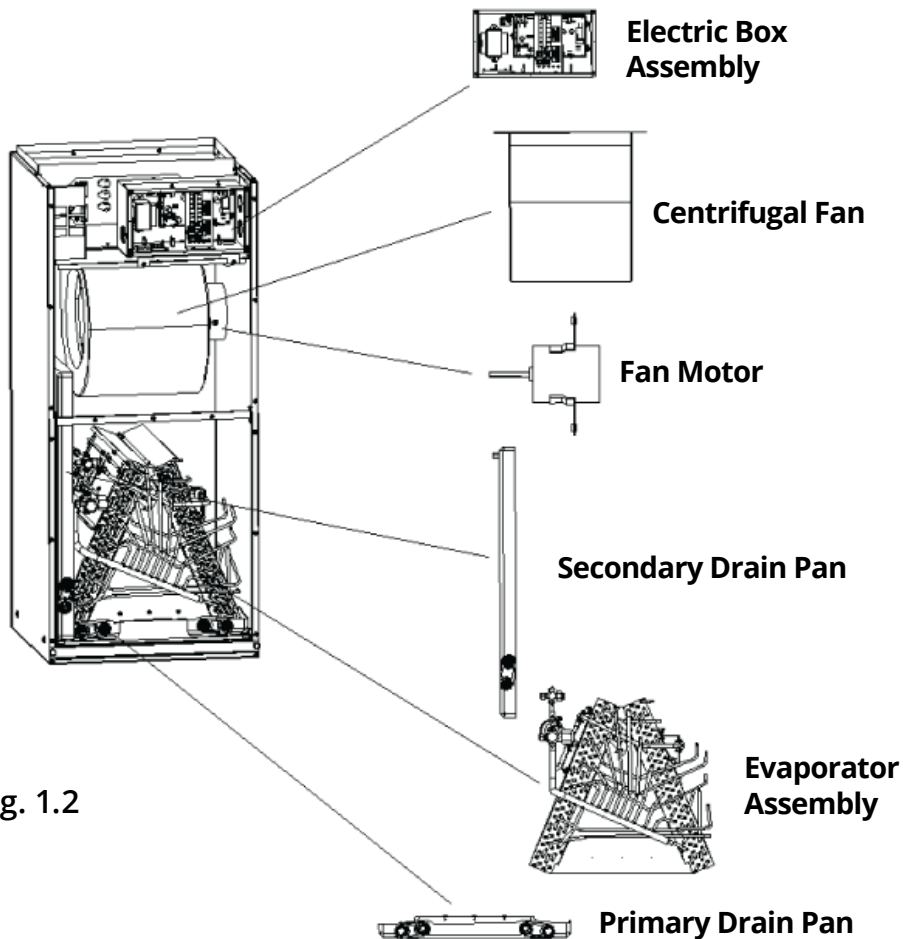


Fig. 1.2

Model	Cooling capacity (ton)	Optional electric heater (kW)
MDUI18024 / MDUI18036	3.0	5-10
MDUI18048	4.0	15
MDUI18060	5.0	15

Model	Motor @ 230V~, 60Hz	
	HP	FLA
MDUI18024 / MDUI18036	1/2	2.1
MDUI18048 / MDUI18060	1	3.2

Unit: inch (mm)

Model	Filter size
MDUI18024/MDUI18036	19-5/16 in x 20-5/16 in x 5/8 in (490 mm x 516 mm x 15 mm)
MDUI18048/MDUI18060	20-11/16 in x 20-5/16 in x 5/8 in (525 mm x 516 mm x 15 mm)

NOTE

1. Dry coil and filter should be installed based upon nominal tonnage.
2. Use 0.96 as approximate SCFM correction factor for wet coil (optional).

! The Universal™ Series Has 2 Installation Methods

1. The Conventional Weld Line Set Installation

Instructions can be found on **page 11**

OR

View complete install video by scanning this QR code



MRCOOL®
Preferred Method

2. No-Vac® Quick Connect® Line Set* Installation

Instructions can be found on **page 12**

OR

View complete install video by scanning this QR code



***Pat. <https://mrcool.com/mrcool-patents/>**

! CAUTION

- Before servicing or installing this equipment, the electrical power to this unit must be in the “OFF” position.
- More than one electrical disconnect may exist on this unit. Lock out and tag the switch with a suitable warning label. Failure to observe this warning may result in electrical shock that can cause personal injury or death.
- Due to high system pressure and the potential for electrical shock, installation and service work can be dangerous. Only trained and qualified persons are permitted to install or service this equipment. Observe all warnings contained in this manual and labels/tags attached to the equipment.

1. Checking Product Received

After receiving the product, please check for any damage caused by transportation. Shipping damage is the responsibility of the carrier. Verify the model number, specifications, and accessories are correct prior to installation. The distributor or manufacturer will not accept claims from dealers for transportation damage or installation of incorrectly shipped units. If an incorrect unit is supplied, it must not be installed and it is to be returned to the supplier. The manufacturer assumes no responsibility for the installation of incorrectly delivered units.

2. Before Installation

Carefully read all instructions for the installation prior to installing product. Make sure each step or procedure is understood and any special considerations are taken into account before starting installation. Assemble all tools, hardware and supplies needed to complete the installation. Some items or tools may need to be purchased separately. **NOTE: Make sure everything needed to install the product is on hand before starting.**

3. Codes & Regulations

This product is designed and manufactured to comply with national codes. It is the installer’s responsibility to install the product in accordance with such codes and/or any prevailing local codes/regulations. The manufacturer assumes no responsibilities for equipment installed in violation of any codes or regulations.

4. Replacement Parts

When reporting shortages, damages, or ordering repair parts, be sure to give the complete product model and serial numbers as stamped on the product. Replacement parts for this product are available through your contractor or local distributor.

Installation Location

WARNING

- When installing the air handler, attempt to minimize the length of refrigerant tubing needed as much as possible.
- When installing in an area directly over a finished ceiling (such as an attic), installation of an emergency drain pan is required directly under the unit. See local and state codes for requirements.
- When installing this unit in an area that may become wet, elevate the unit with a sturdy, non-porous material. In installations that may lead to physical damage (i.e. a garage), it is advised to install a protective barrier to prevent such damage.
- ⊗ ***DO NOT*** install this unit outdoors. This air handler is designed for indoor installation only.
- ⊗ ***DO NOT*** operate this product without complete ductwork attached. This air handler is designed for a complete supply and return ductwork system.
- ⊗ ***DO NOT*** install the air handler in a location above or below the condenser that violates the instructions provided with the condenser. Service clearance is to take precedence. Allow a minimum of 24 in (610 mm) service clearance in front of the unit.
- ⊗ ***DO NOT*** install the air handler in enclosed areas, such as garages, utility rooms or parking areas. Carbon monoxide producing devices (such as an automobile, space heater, gas water heater, etc.) should not be operated in enclosed areas such as unventilated garages, utility rooms, or parking areas because of the danger of carbon monoxide (CO) poisoning resulting from exhaust emissions. If a furnace or air handler is installed in an enclosed area such as a garage, utility room, or parking area, and a carbon monoxide producing device is operated therein, there must be direct ventilation to the outside. Adequate ventilation is necessary to avoid the danger of CO poisoning which can occur if a carbon monoxide producing device continues to operate in an enclosed area. If these warnings are not followed, carbon monoxide emission can be (re)circulated throughout the building from the air handler causing serious illness including permanent brain damage or death.

- If air handler is installed as shown in Fig. 2.1, the air handler should be concealed in a specific room or space and make sure the air handler is not accessible to the general public.

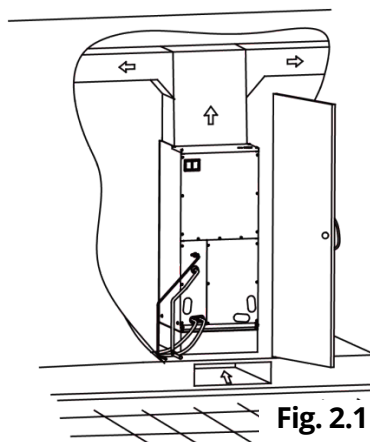


Fig. 2.1

- If air handler is installed as shown in Fig. 2.2, make sure there is enough space for care and maintenance, and that the height between the air handler and ground is above 8 ft (2500 mm). Also make sure the air handler is not accessible to the general public.

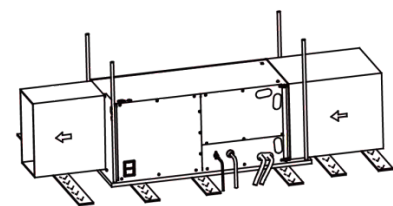


Fig. 2.2

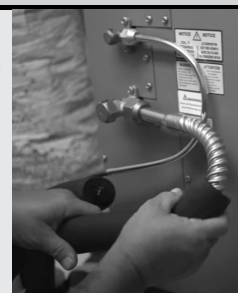
Conventional Line Set Installation

Specification of Connection Pipe

Model	External Diameter (inch)	
	Vapor Pipe	Liquid Pipe
MDUI18024/MDUI18036 (2-3 ton)	3/4 in	3/8 in
MDUI18048/MDUI18060 (4-5 ton)		

IMPORTANT

In order to prevent the refrigerant piping from sweating, you can insulate them with closed-cell insulation foam for refrigerant line sets which is readily available.



Piping Preparation

1. WELD Type Complete Unit Replacement

All cut ends are to be round, clean, and burr free. Failure to follow this practice increases the chances for refrigerant leakage. Ensure that the line set size matches service valve connection.

 **DO NOT** crimp the service valve connector when the pipe is smaller than the connector. See diagram below.

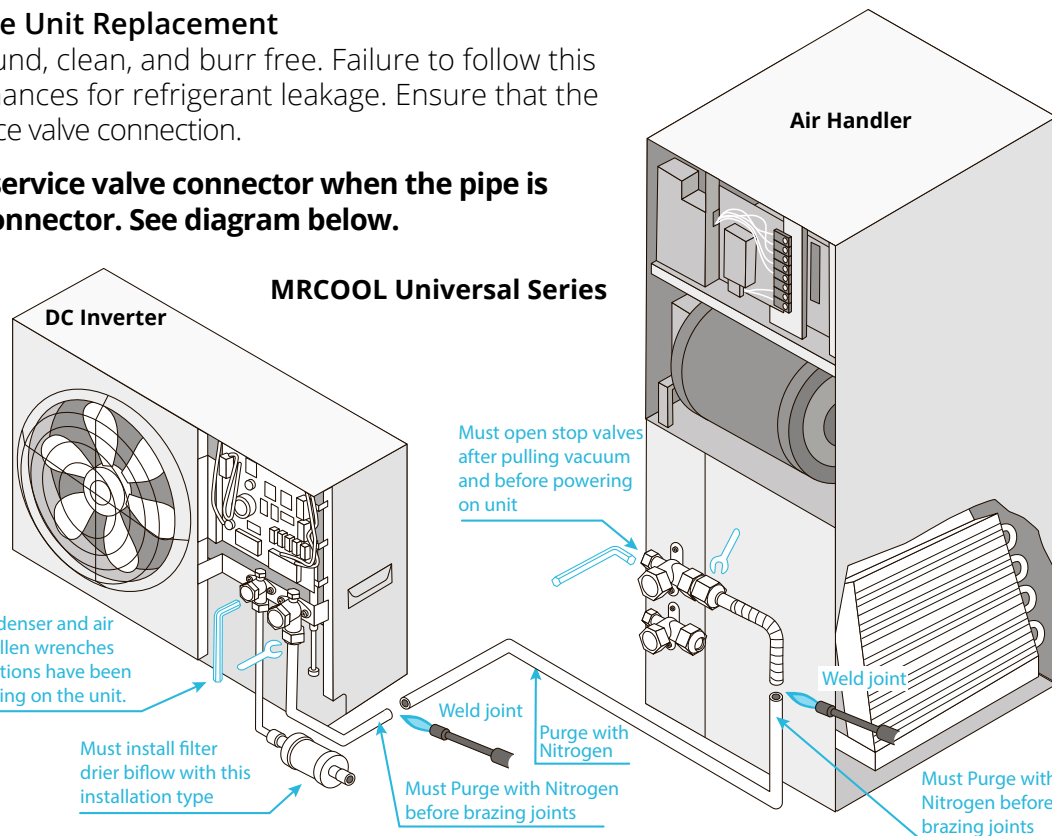
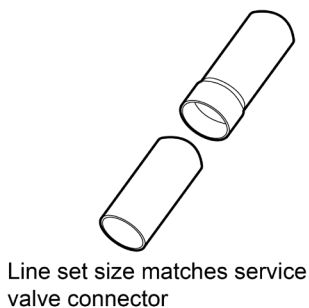
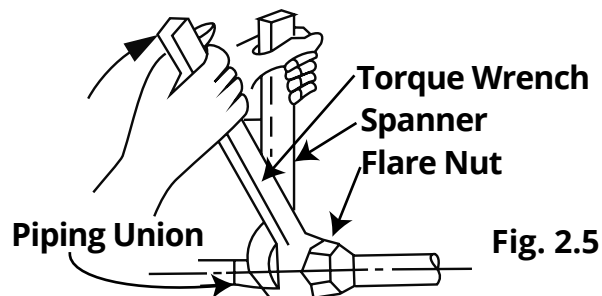
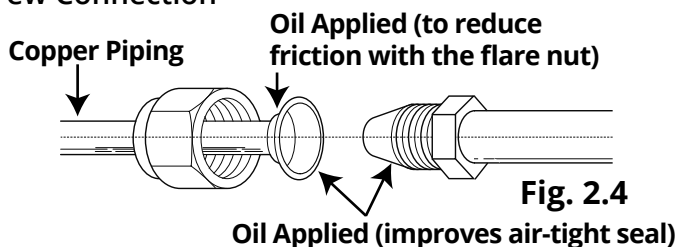


Fig. 2.3

2. Screw Connection



Pipe diameter (inch)	Tightening torque ft/lb (Nm)
1/4	11-22 ft/lb (15-30 Nm)
3/8	26-29 ft/lb (35-40 Nm)
1/2	33-37 ft/lb (45-50 Nm)
5/8	44-48 ft/lb (60-65 Nm)
3/4	52-55 ft/lb (70-75 Nm)
7/8	59-63 ft/lb (80-85 Nm)

No-Vac® Quick Connect® Line Set* Installation

INSTRUCTIONS FOR USE WITH NO-VAC™ QUICK CONNECT® LINE SET* SOLD SEPARATELY
KINK RESISTANT, PRECHARGED, SIMPLE SECURE QUICK CONNECT, 100% CONNECTION GUARANTEE

Please read and follow the instructions and diagram below* :
Connections must be made exactly as specified to avoid system leaks and /or damage

1. Take out matching male connectors **M1** and **M2**.
2. **Remove** protective cap with the copper gasket at each stop valve on the **DC INVERTER** and ensure the threads are clean and complete.
3. **Tighten** the **M1** connector to the **cutoff valve *1** with a tightening force of **37 ft/lb (50 Nm)**. **Tighten** the **M2** connector to the **cutoff valve *2** with a tightening force of **52 ft/lb (70.5 Nm)**.
4. **Repeat** step 3 for **AIR HANDLER** at the other end of the **LINE SET**.
5. Unroll and route the **LINE SET** between the **AIR HANDLER** and the **DC INVERTER**. Bend the line set piping by hand to route the line set to suit your application. Use care when bending the line set. Please refer to the **Bending the Line Set** section of **Pg. 13** for more detailed instructions on how to properly and safely bend the line set refrigerant piping, as well as the correct bend radius.
6. **Remove** the protective caps of the valves at both ends of the **LINE SET**. Verify that all threads are clean and complete.
7. **Tighten** the **LINE SET F1** valve to the **M1 Connector** (attached in step 3) with a force of **33 ft/lb (45 Nm)**. **Tighten** the **LINE SET F2** valve to the **M2 Connector** (attached in step 3) with a tightening force of **48 ft/lb (65 Nm)**.
8. **Repeat** this process for the **AIR HANDLER** at the other end of the **LINE SET**.
9. At the **OUTDOOR UNIT** remove the **protective cap** at the **cutoff valve switch** and **open** the **stop/cutoff valve** with a hex wrench to release refrigerant into the system. **If** there is any fizz, grease or other **leakage**, then **close** the valve **immediately** and **check** that **steps 3 and 7** were done properly. **Otherwise**, using a sponge or spray bottle, apply a soapy water solution to the connection points to check for micro leaks. **If any bubbles form** it indicates there is a leak. If this does occur, **close** the valve **immediately** and **check** that **steps 3 and 7** were done properly and re-tighten the valves and line set if necessary.
10. **After** the correct connection, **re-tighten** the cutoff valve's **protection cap** and **cover** the **M1, M2** and **F1, F2** connections with the gray **insulating sleeve** to help **prevent condensation**.

IMPORTANT

When running the Line Set through the knockout hole of the condenser, it may be necessary to slightly trim the line set insulation so it feeds through the hole freely. Otherwise, it may be difficult to connect it to the condenser. Once the installation is complete, pack the hole with neoprene to prevent small animals and insects from entering the condenser.



NOTE ON WRENCHES

The wrench sizes needed for tightening the No-Vac® Quick Connect® Line Set are listed below. However, based on the availability of the wrench sizes needed, it is recommended to use two large crescent (adjustable-type) wrenches. Using one to hold the valve while using the other wrench to tighten the line set connector.

Piping Size (Stamped on piping)	Wrench Size Required	
	Standard	Metric
3/8"	1"	25 mm
3/4"	1-3/8"	35 mm

Or 2x large crescent (adjustable-type) wrenches

Allen/Hex Wrench Sizes Needed To Open Stop/Cutoff Valves	
Piping/Valve Size (Stamped on piping)	Allen Wrench Size
3/8"	5 mm
3/4"	8 mm

IMPORTANT

The stop/cutoff valves on the unit must be opened **AFTER** connecting the lines and **BEFORE** turning on the unit. Otherwise, operation can cause leakage and/or damage to the unit.

Complete unit replacement using the No-Vac® Quick Connect® lines

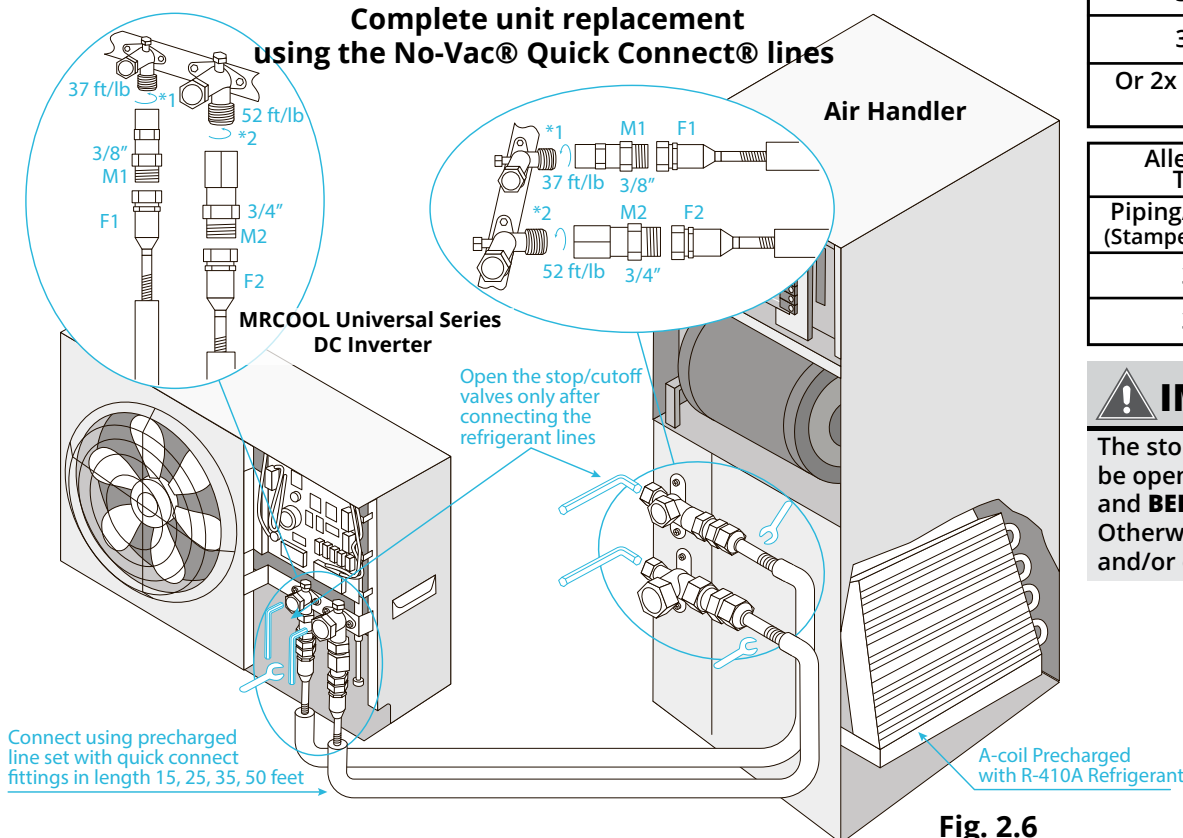


Fig. 2.6

Failure to follow the instructions provided could result in severe harm to you, this product, or other property. The manufacturer, distributor, and seller are not responsible for any harm resulting from the failure to follow instructions and the failure to follow these instructions will void any and all warranties express or implied.

*Pat. <https://mrcool.com/mrcool-patents/>

www.mrcool.com

v10-25-2021

Unit Installation

Bending the Line Set

1. Use your hands to bend the pipes. Work carefully not to collapse the pipes during bending.
2. If the pipe is repeatedly bent or extended, it will become hard and difficult to manipulate. Avoid bending or extending the pipe more than 3 times.

⊘ **DO NOT** bend the pipes in at an angle greater than 90°.

⊘ **DO NOT** bend the pipe excessively, otherwise it will break.

Please refer to Fig. 2.7

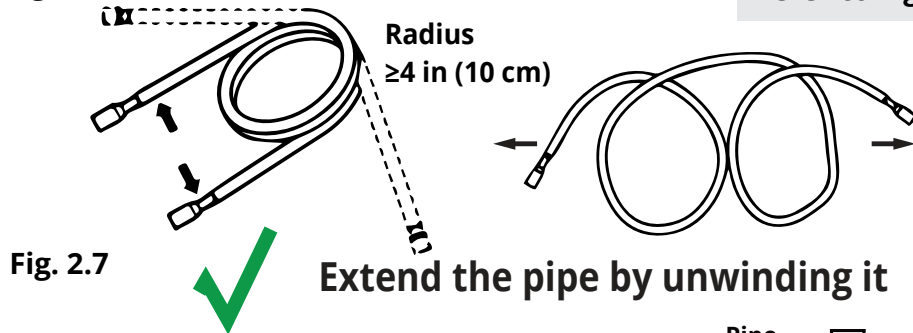


Fig. 2.7

MINIMUM BEND RADIUS

When bending connective refrigerant piping, the minimum bending radius is 4 in (10 cm). Refer to Fig. 2.7.

3. As shown in Fig. 2.8, use a sharp cutter to cut the pipe insulation and bend the pipe after it is exposed. After bending, place the insulation back on the pipe and secure it with adhesive tape.

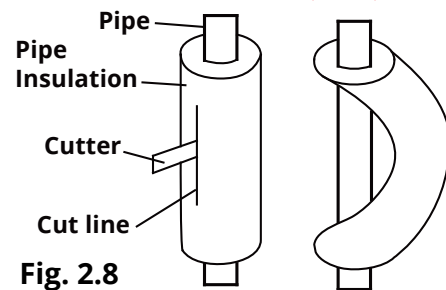


Fig. 2.8

Condensate Removal

1. The condensate drain pipe should be connected into a special drain system for the unit.
2. The drain pan has primary and secondary drain connections. Condensate removal is performed by attaching a 3/4 in (19 mm) PVC pipe to the evaporator coil pan and terminated in accordance with local or state plumbing and HVAC codes. The installation must include a "P" style trap that is located closely to the evaporator coil.

⚠ WARNING

- ⊘ **DO NOT** over-tighten the drain connection in order to prevent damage to the evaporator drain pan. See the following figure for details of a typical condensate line "P" trap.
- ⊘ **DO NOT** connect the condensate drain pipe into the waste pipe or other pipelines that are likely to produce corrosive or peculiar smells. This will prevent odors from entering indoors or corrupting the unit.
- ⊘ **DO NOT** connect the condensate drain pipe into the rain pipe. This will prevent rain water from pouring in and causing property loss or personal injury.

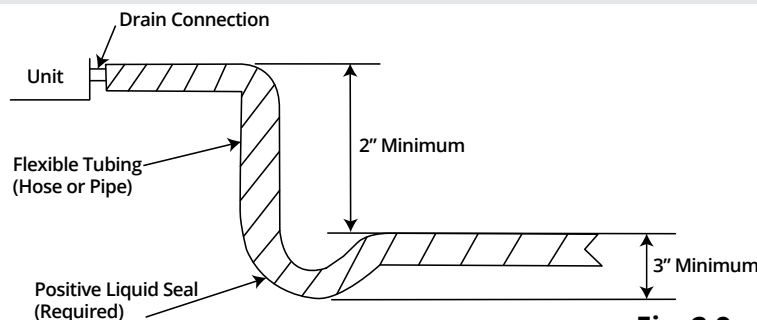


Fig. 2.9

Ductwork

This air handler is designed for a complete supply and return ductwork system.

WARNING

⚠ ***DO NOT* operate the unit without all ductwork completed and attached.**

- Inadequate ductwork that restricts airflow can result in improper performance and could cause compressor or heater failure.
- Ductwork is to be constructed in a manner that limits restrictions and maintains suitable air velocity.
- Ductwork is to be sealed to the unit in a manner that will prevent leakage.

Return ductwork:

⚠ ***DO NOT* dispose of the return ductwork in an area that can introduce toxic or objectionable fumes/odors into the ductwork. The return ductwork is to be introduced into the air handler bottom (upflow configuration).**

Return Air Filters:

Each installation must include a return air filter for the air handler or externally using a return air filter grille.

Electric Heater

The air handlers listed in this manual do not have a factory installed electric heater. An electric heat kit is available as an optional accessory. The only heat kits that can be used are **MHK**U** series listed on the following page. Please refer to installation instructions provided with the heat kit for the correct installation procedure.

WARNING

The electrical characteristics of the air handler, the electric heat kit, and the supply power should be identical.

Electric Heat Kit Installation

! CAUTION

- Ensure that all power supply is disconnected prior to installing the heat kit.
- A means of strain relief and conductor protection must be provided at the supply wire entrance into cabinet.
- Only use copper conductors.
- Installation must follow National Electric Code (NEC) and other applicable codes.
- If this appliance is installed in an enclosed area such as a garage or utility room with any carbon monoxide producing appliance, ensure the area is properly ventilated to the outside.
- A filter dryer is recommended for installation based on nominal tonnage.
- Use 0.96 as approximate SCFM correction factor for wet coil.

1. Refer to the Table below for the appropriate optional heat kit.
2. Check for any physical damage; do not install a damaged heat kit.
3. Remove the upper access panel from air handler.
4. Remove the cover plate from air handler.
5. Slide the heat kit into the slot and secure element plate with previously removed screws.
6. Insert power leads into the circuit breaker lugs or stripped red and black wires (for heat kits without a circuit breaker) and tighten.
7. Connect ground wire to ground lug.
8. Break out appropriate area of the plastic circuit breaker cover on the access panel of the air handler. Knock out the holes according to the actual installation number and circuit breaker positions. **If a circuit breaker is not installed, do not knock out the holes; otherwise, electric shock may occur.**
9. Connect power cords and thermostat wires.
10. Replace access panel and check operation.

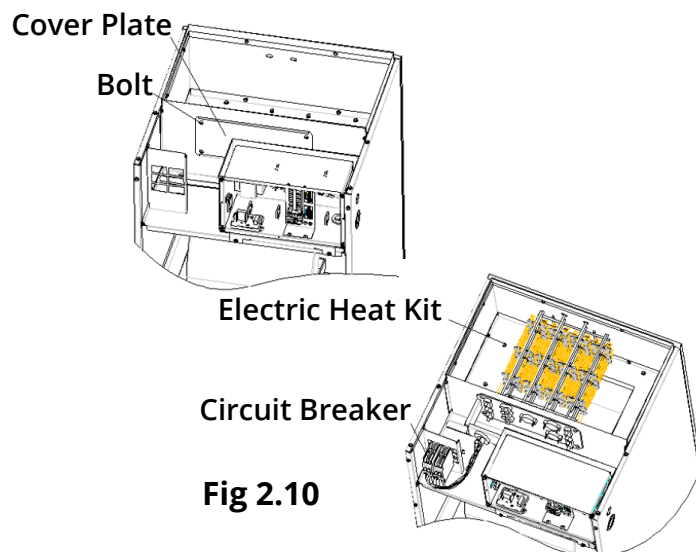


Fig 2.10

Compatible Heat Kits

Kit #.	Description	Tonnage
MHK05U	5kW heat strip	2 Ton or 3 Ton
MHK08U	8kW heat strip	2 Ton or 3 Ton
MHK10U	10kW heat strip	3 Ton ONLY
MHK15U	Circuit Breaker, 15kW heat strip	4 Ton or 5 Ton
MHK20U	Circuit Breaker, 20kW heat strip	4 Ton or 5 Ton

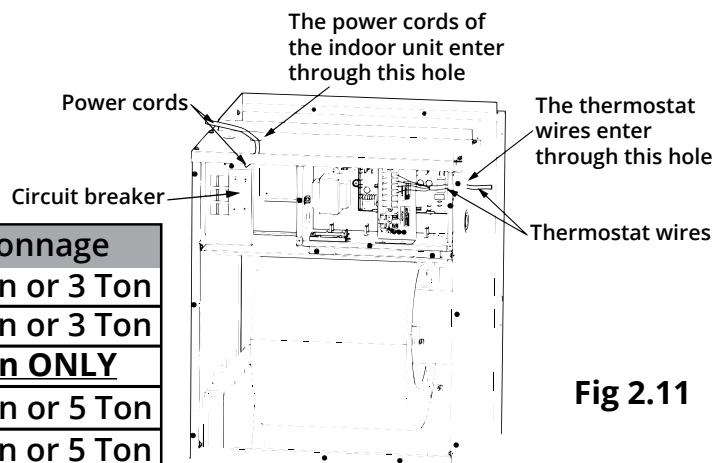


Fig 2.11



IMPORTANT

You must use a compatible heat kit listed in the above chart. Using an incorrectly sized heat kit could cause the unit to overheat and/or equipment damage.

Air Handler Field Conversion

Converting a 3-Ton Unit to 2-Ton

Follow these instructions during unit installation in order to enable a Universal® Series 3-ton condenser and air handler split system to operate at 2-ton capacity.

⚠ **DO NOT attempt this conversion while the unit is powered on.**

1. Locate the capacity dip switch on the air handler main board. The capacity dip switch is circled on the photo below.
2. The default position of the capacity dip switch is 1, 2, & 4 'Up' and 3 'Down' on both the SA2 and SA1 switches.
3. The default position of the capacity dip switch is 36K.
4. To activate the 24K capacity, flip capacity dip switch 2 & 4 on SA2 and SA1 to Down. Flip capacity dip switch 3 on SA2 and SA1 to Up.

Converting a 5-Ton Unit to 4-Ton

Follow these instructions during unit installation in order to enable a Universal® Series 5-ton condenser and air handler split system to operate at 4-ton capacity.

⚠ **DO NOT attempt this conversion while the unit is powered on.**

1. Locate the capacity dip switch on the air handler main board. The capacity dip switch is circled on the photo below.
2. The default position of the capacity dip switch is 2, 3, & 4 'Up' and 1 'Down' on both the SA2 and SA1 switches.
3. The default position of the capacity dip switch is 60K.
4. To activate the 48K capacity, flip capacity dip switch 1, 3, & 4 on SA2 and SA1 to Down. Flip capacity dip switch 2 on SA2 and SA1 to Up.

— 2 Ton Settings —

Low Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

Medium Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

High Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

— 3 Ton Settings —

Low Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

Medium Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

High Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

— 4 Ton Settings —

Low Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

Medium Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

High Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

— 5 Ton Settings —

Low Fan Settings

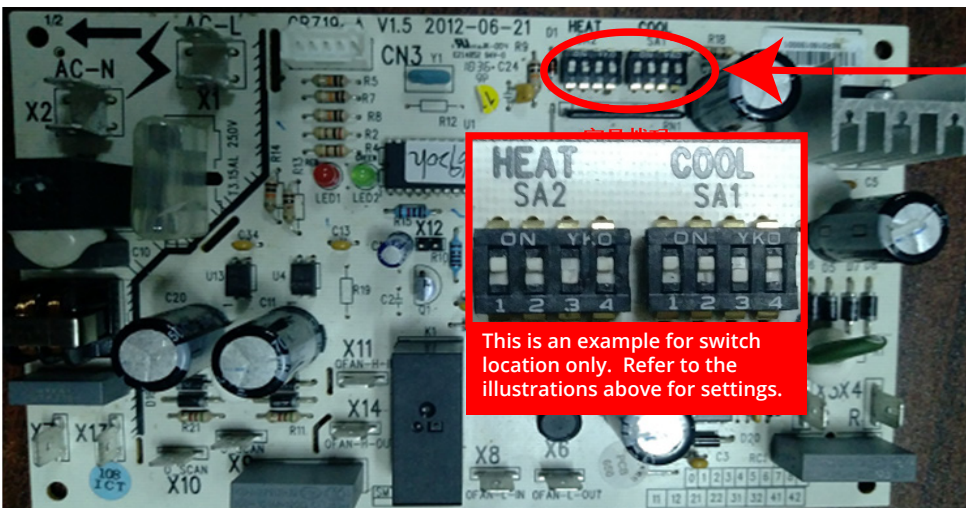
HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

Medium Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4

High Fan Settings

HEAT (SA2)				COOL (SA1)			
1	2	3	4	1	2	3	4



Location of Dip Switch on Air Handler Main Board

NOTE ON DIP SWITCH ORIENTATION

Depending on your application, and the position unit is mounted in, the DIP Switches may be upside down.

Fig 2.12

NOTE

Refer to the Universal Condenser Manual for the Dip Switch instructions and settings for the condenser.

Electrical Connection

Electrical Regulations



WARNING Before performing electrical work, read the following regulations

- ⊘ **DO NOT change the power cables arbitrarily.**
- ⊘ **DO NOT change the length and terminals of the power cables.**
 1. Electrical installation must be conducted by professionals in compliance with local laws, regulations, and this installation manual. Never artificially extend the length of a power cord. The electric circuit must be equipped with a circuit breaker and air switch. Both must have sufficient capacity.
 2. Unit operating power must be within the nominal range stated in the instruction manual. Use a specialized power circuit for the unit. **DO NOT draw power from another power circuit.**
 3. The air conditioner circuit should be at least 5 ft (1.5 m) away from any flammable surface.
 4. The external power cords, the thermostat wires, and thermostat must be effectively fixed.
 5. The external power cords, thermostat wires, and thermostat must **NOT** directly contact any hot objects. For example: they must not come into contact with chimney pipes, warm gas pipes or other hot objects.
 6. The external power cords, thermostat wires, and thermostat must **NOT** be squeezed. Never pull, stretch, or bend the wires.
 7. The external power cords, thermostat wires, and thermostat must **NOT** collide with any metal beam or edge on the ceiling, or touch any metal burrs or sharp metal edges.
 8. Connect wires in accordance to the circuit diagram labeled on the unit or electric box. Screws must be tightened. Slipped screws must be replaced by specialized flat-head screws.
 9. Wiring terminals should be connected securely to the terminal board. A loose connection is unsafe.
 10. Only use the power cables that are delivered along with the air conditioner. If you want to change the power cables, please contact MRCOOL's local service center.
 11. After the electrical installation is finished, please use wire clamps to secure the power cords and thermostat wires. Make sure the wires are not clamped too tightly.
 12. The wire gauge of the power cord should be sufficiently large. A damaged power cord or other wires must be replaced by specialized wires. Wiring must be completed according to national wiring rules and regulations.
 13. This product is factory shipped for use with a 208/230V-1Ph-60Hz electrical power supply. This air handler must not be reconfigured to operate with any other power supply.
 14. The unit must have uninterrupted and unbroken electric grounding to minimize the possibility of personal injury if an electric fault occurs. The electric grounding circuit may consist of an appropriate sized power cord connected with the grounding piece, located in the unit control box, and also connecting to the building electric service panel. Other methods of grounding are permitted if performed in accordance with the National Electric Code (NEC), American National Standards Institute (ANSI), National Fire Protection Association (NFPA) 70, and local/state codes. In Canada, electric grounding conforms to the Canadian electric code CSA c22.1. Failure to observe this warning can result in electrical shock that can cause personal injury.

*****Disclaimer: Wiring must meet code specs according to the capacity/tonnage of the unit.*****

Electrical Connection

Electrical Parameters

Indoor Unit Model	Power Supply	Min. Circuit Ampacity	Max. Overcurrent Protection (A)
MDUI18024/MDUI18036	208/230V 60Hz	4 amps	15 amps
MDUI18048/MDUI18060	208/230V 60Hz	4 amps	15 amps

1. The fuse is located on the main board.
2. Install a circuit breaker at every power terminal near the units (indoor unit and thermostat) with at least 0.12 in (3 mm) contact gap. Both units must reach the plug.
3. Circuit breaker and power cord specifications listed in the above table are determined based on the maximum power input of the units.
4. Specifications of power cords listed in the above table are applicable in a working condition where the ambient temperature is 104°F (40°C) and multi-core copper cable (e.g. YJV copper cable, with insulated PE and PVC sheath) is protected by a conduit, and is resistant to 194°F (90°C) in maximum (see IEC 60364-5-52). If working conditions change, please adjust the specifications according to national standards.
5. Specifications of circuit breaker are based on a working condition where the working temperature is 104°F (40°C). If working conditions change, please adjust the specifications according to national standards.
6. The gauge of thermostat wire between the indoor unit and thermostat should be no less than 18 AWG and at least 6 strand to ensure a proper connection. Please select a proper length of wire according to local conditions. **The maximum connection length is 98 feet (30 m).**
7. Thermostat wires must not be twisted together.

Electrical Connection

Connecting the Power Cord & Communication Wire



WARNING

1. Before work begins, please check to ensure the unit and thermostat are powered "OFF".
2. Match the terminal numbers and wire colors with the colors indicated in the indoor unit.
3. Incorrect wiring connections could burn the electrical components.
4. Connect the wires securely to the wiring box. Incomplete installation could lead to a fire hazard.
5. Please use wire clamps to secure the external covers of connecting wires. (Insulators must be clamped securely; otherwise, electrical leakage may occur.)
6. Ground wire should be securely connected.

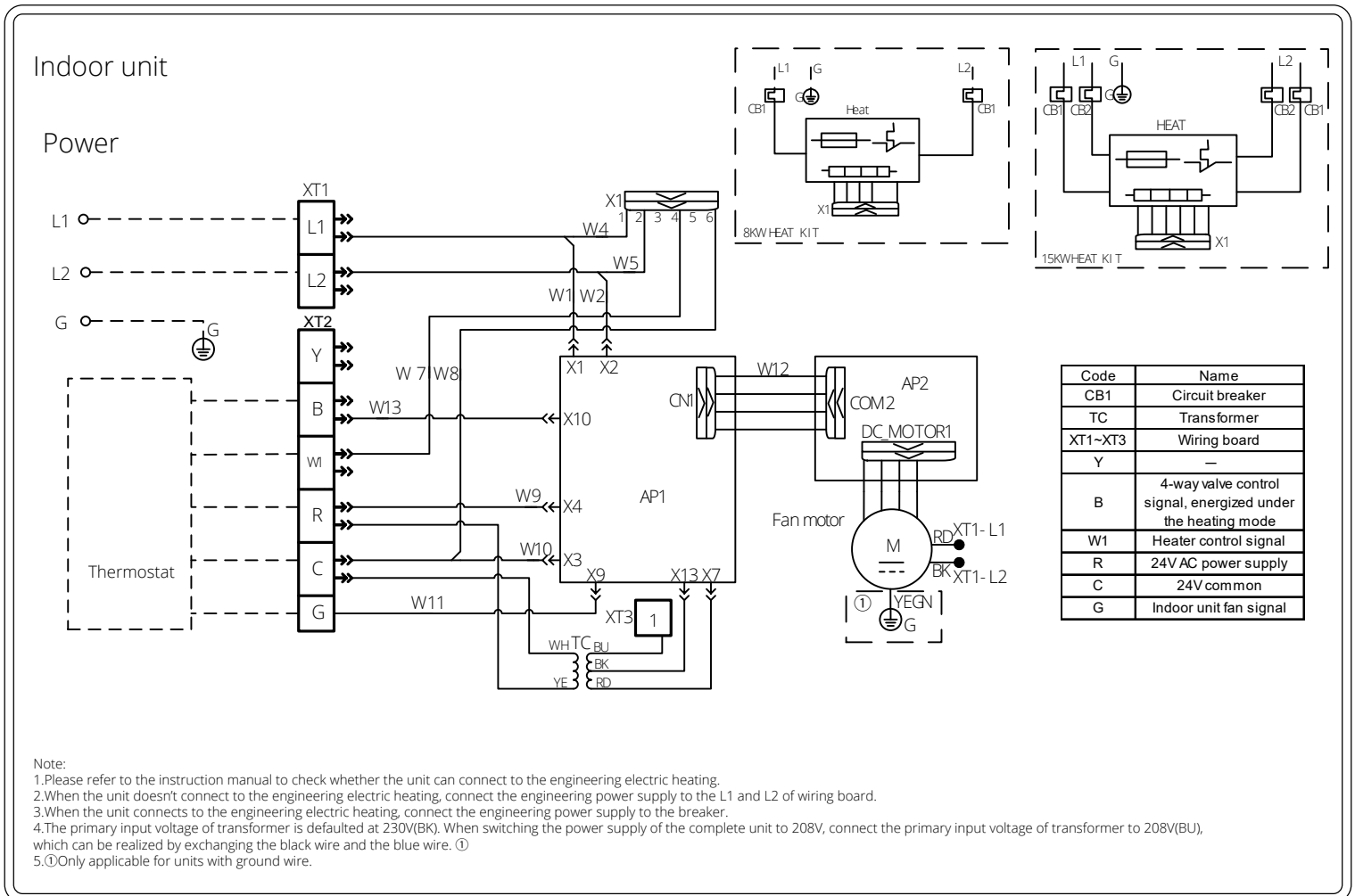


Fig 2.13

Electrical Connection

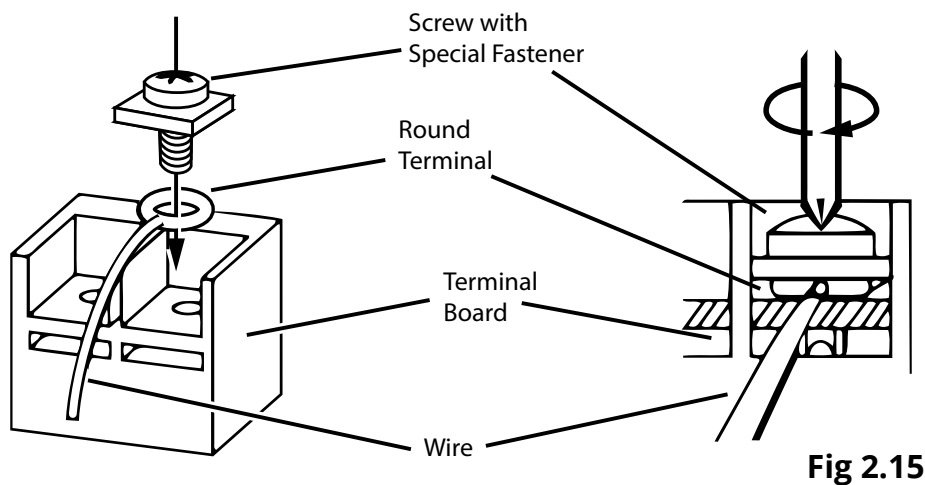
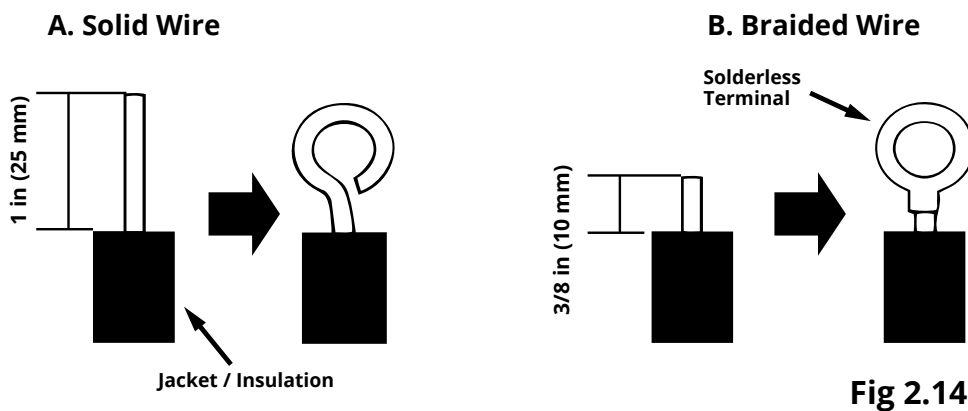
Connecting the Power Cord & Thermostat Wires

For solid wires (Refer to Fig. 2.14 A):

1. Use wire cutters to cut off the wire end and then peel away about 1 in (25 mm) of the insulation layer.
2. Use a screwdriver to unscrew the terminal screw on the terminal board.
3. Use nippers to bend the solid wire into a ring that fits the terminal screw.
4. Form a proper ring and attach to the terminal board. Use a screwdriver to tighten the terminal screw.

For braided/strand wires (Refer to Fig. 2.14 B & Fig. 2.15):

1. Use wire cutters to cut off the wire end and then peel away about 3/8 in (10 mm) of the insulation layer.
2. Use a screwdriver to unscrew the terminal screw on the terminal board.
3. Use a round terminal fastener or clamp to secure the round terminal firmly on the peeled wire end.
4. Locate the round terminal conduit. Use a screwdriver to replace it and tighten the terminal screw (as shown in Fig. 2.15).



Unit Installation

For all terminal wiring (Refer to Fig. 2.17 (2-3 ton unit) below, Fig. 2.18 (4-5 ton unit) on the next page):

5. Lead the connection wire and power cord through the insulation tube. Then secure the wires with wire clamps (as shown in Fig. 2.16).

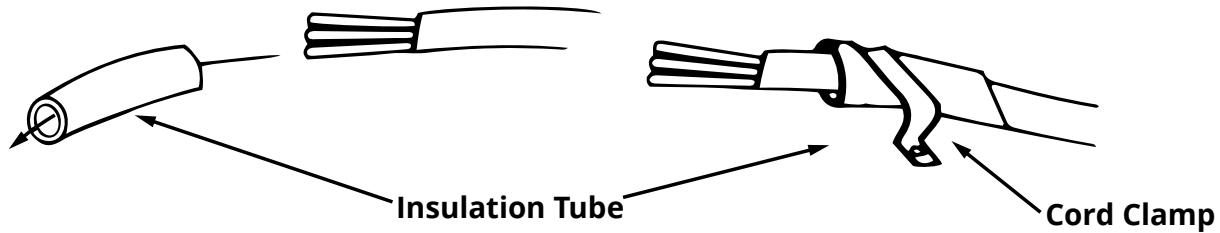


Fig. 2.16

Electrical wiring of Single-phase unit: MDUI18024/MDUI18036 (2-3 Ton Unit w/electric heater)

Optional: Heat Kit Installation Instructions

1. Remove the upper access panel from the air handler.
2. Remove the cover plate inside the upper access panel of the air handler.
3. Slide the heat kit into the slot and secure element plate with previously removed screws.
4. Make sure to insert the supporting poles of the heat kit into the supporting hole of the air handler.
5. Connect the quick connection plug and fasten the loose wires by using wire ties.
6. Install the circuit breaker into the mounting rail, break out appropriate area of the plastic circuit breaker cover on the access panel of the air handler.
7. **a.** When installing the MHK05U, MHK08U, or MHK10U, connect the power from the Circuit Breaker Panel to L1 and L2 of the circuit breaker included with the electric heat kit.
b. When connecting the electric heat kit to the air handler, use the Molex Plug Wiring Harness from the electric heat kit and attach it to the Molex Plug Wiring Harness coming from air handler's PCB board.
c. The Molex Plug Connection will power the air handler, so a separate source of incoming power for the air handler itself is not needed.
d. Please see the chart below for proper sizing of panel.

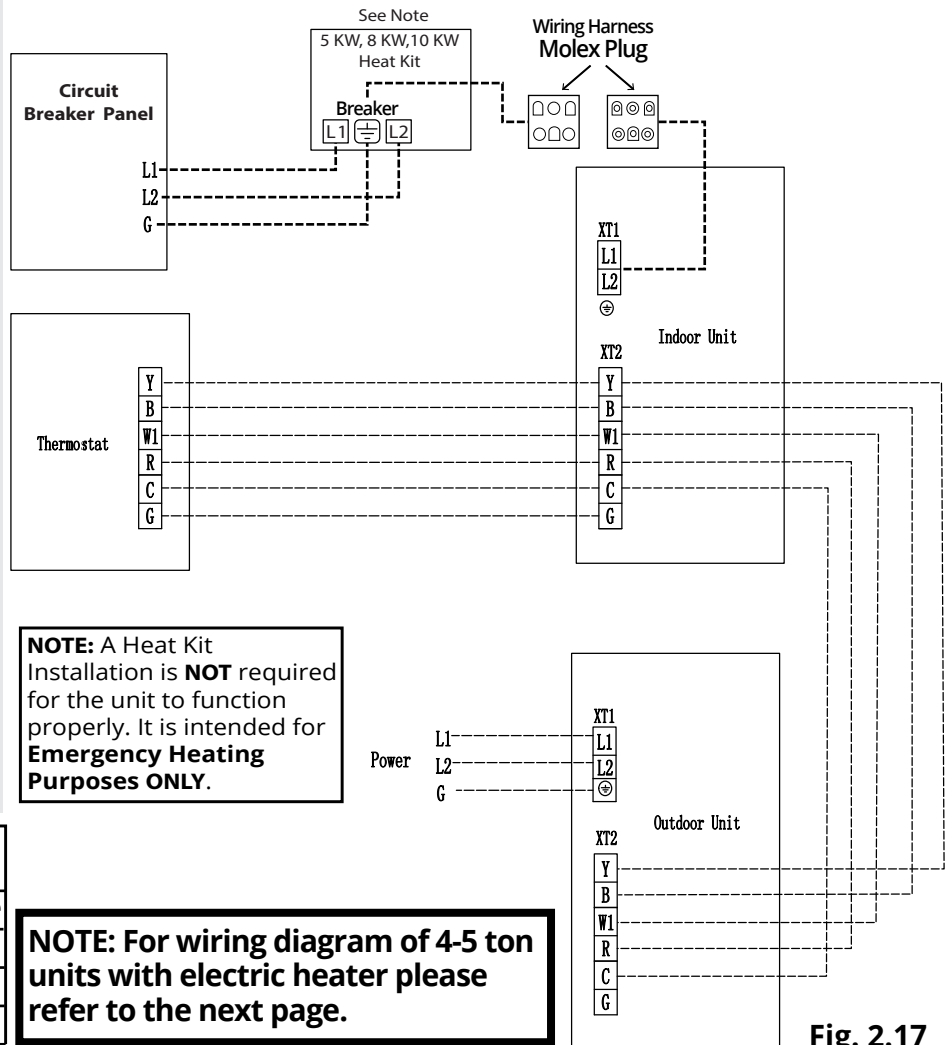


Fig. 2.17

Circuit Breaker Size in Panel for Air Handler + Heat Kit	
Combination	Max Amperage
MDUI 24K/36K + MHK05U	30 Amps
MDUI 24K/36K + MHK08U	45 Amps
MDUI 36K + MHK10U	60 Amps

NOTE: For wiring diagram of 4-5 ton units with electric heater please refer to the next page.

Electrical Connection

Connecting the Power Cord & Communication Wire



WARNING

⚠ **DO NOT** bundle the thermostat wires or lay them side by side, otherwise errors will occur.

1. High and low voltage wires should be led through different rubber rings of the electric box cover.
2. High and low voltage wires should be secured separately. Secure the high voltage wires with large clamps and the lower voltage wires with small clamps.
3. Use screws to tighten the thermostat wires and power cords of the units on the terminal board. If the power cords and thermostat wires are improperly connected, it could create a fire hazard and the air conditioner may suffer damage.
4. Ground the units by connecting the ground wire and ensure it is secure.
5. The units should comply with applicable local and national rules and regulations on power consumption.
6. When connecting the power cord, make sure the phase sequence of the power supply matches with the corresponding terminals, otherwise the compressor will get reversed and operate abnormally.

Electrical wiring of Single-phase unit: MDUI18048/MDUI18060 (4-5 Ton Unit w/electric heater)

Optional: Heat Kit Installation Instructions

1. Remove the upper access panel from the air handler.
2. Remove the cover plate inside the upper access panel of the air handler.
3. Slide the heat kit into the slot and secure element plate with previously removed screws.
4. Make sure to insert the supporting poles of the heat kit into the supporting hole of the air handler.
5. Connect the quick connection plug and fasten the loose wires by using wire ties.
6. Install the circuit breaker into the mounting rail, break out appropriate area of the plastic circuit breaker cover on the air handler access panel.
7. **a.** When installing the MHK15U or MHK20U, connect two separate lines of power from the Circuit Breaker Panel to L1 and L2 of the two circuit breakers included with the electric heat kit.
b. When connecting the electric heat kit to the air handler, use the Molex Plug Wiring Harness from the electric heat kit and attach it to the Molex Plug Wiring Harness coming from air handlers PCB board.
c. The Molex Plug Connection will power the air handler, so a separate source of incoming power for the air handler itself is not needed.
d. Please see the chart below for proper sizing of panel.

Circuit Breaker Size in Panel for Air Handler + Heat Kit	
Combination	Max Amperage
MDUI 48K/60K + MHK15U	60/30 Amps
MDUI 48K/60K + MHK20U	60/60 Amps

NOTE: A Heat Kit Installation is **NOT** required for the unit to function properly. It is intended for **Emergency Heating Purposes ONLY.**

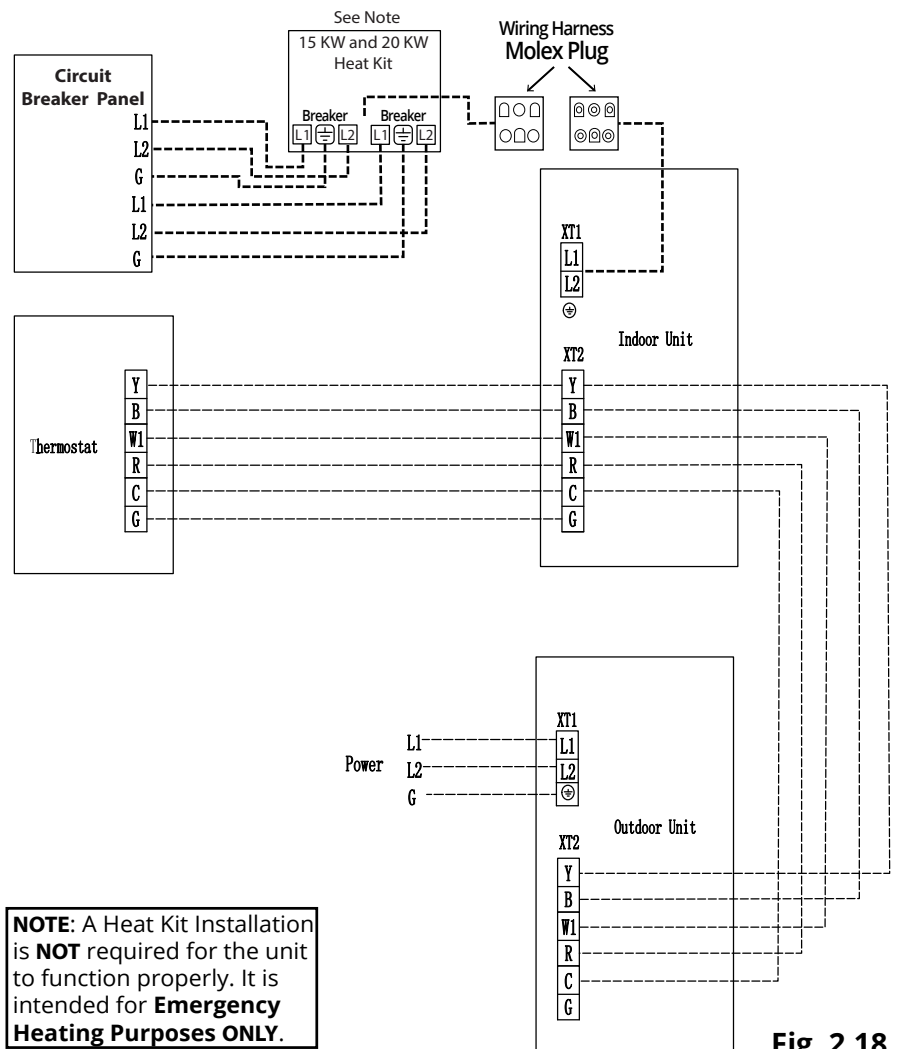


Fig. 2.18

Before Test Run

Only perform test run **AFTER** you have completed the following steps:

- **Electrical Safety Checks** – Confirm that the electrical system is safe and operating properly.
- **Gas Leak Checks** – Check all refrigerant piping connections/valves and confirm that the system is not leaking.
- Confirm that gas and liquid (high and low pressure) valves are fully open.

List of Checks to Perform	Possible Malfunctions	PASS/FAIL	
Is the main body installed securely?	The unit could fall down, vibrate or produce noise		
Did you conduct a water leakage test?	Cooling capacity may become inadequate		
Is the unit well insulated from heat?	Condensate/water droplets may occur		
Does water drain properly from drain hose?	Condensate/water droplets may occur		
Is the voltage consistent with the specifications stated on the nameplate?	The unit could fail or its components may get burned.		
Are the wires, piping, and valves installed correctly?	The unit could fail or its components may ignite.		
Has the unit been safely grounded?	Risk of electrical leakage.		
Do the wire specifications comply with the requirements?	The unit could fail or its components may ignite.		
Are there any obstacles blocking the air inlet or outlets of the units?	Cooling capacity may become unsatisfactory.		
Have you recorded the length of refrigerant pipe and the refrigerant charge amount?	The refrigerant charging amount cannot be controlled.		
Is the panel mounted securely?	It could cause an air leak, vibration, and noise.		
Are there any cracks in the air return or supply pipe?	It could cause an air leak, vibration, and condensation.		

Test Run

Preparation Before Connecting The Power:

⚠ ***DO NOT* connect power if the installation is not complete.**

1. Verify the control circuit is correct and all the wires are firmly and securely connected.
2. Ensure the valves on the vapor and liquid refrigerant lines are completely opened.
3. Remove any scattered objects or debris around the unit, especially metal filings, thrum, and clippings.
4. Ensure the unit's appearance and piping system have not been damaged during transportation or handling.
5. Check for any loose terminals and ensure the phases are correct.

Operation After Connecting The Power:

1. If all the steps above have been completed, power on the unit.
2. Verify the unit functions properly under several of its different operating modes.
3. If there are any loud and/or abnormal sounds, turn off the unit and contact MRCOOL® Tech Support, at (270) 366-0457, immediately.

(1) If your air conditioner fails to function normally, check the following items before conducting maintenance:

Problem	Cause	Corrective Measure
The unit will not activate.	The unit is not connected to a power supply.	Connect it to the power supply.
	Low voltage.	Check the circuit voltage is within specified range.
	Fuse broken or circuit breaker trips off.	Replace fuse or reconnect circuit breaker.
The unit operates but stops immediately.	Air inlet and outlet of the units are blocked.	Clear any obstacles and ensure the area remains well ventilated.
Abnormal cooling or heating.	Air inlet and outlet of the units are blocked.	Remove obstacles.
	Improper temperature setting.	Adjust thermostat temperature setting.
	Doors or windows are opened.	Close the door or windows.
	Rooms exposed to excessive direct sunshine.	Draw curtain or louver.
	Other heat sources in the room.	Reduce other heat sources.
	Filter screen is blocked by dirt.	Clean the filter.

 **NOTICE**

Check the above items and take appropriate corrective measures. If the unit continues to function improperly, immediately disconnect power and contact the MRCOOL® technical department, at (270) 366-0457, or your installation dealer.

Troubleshooting

(2) The following situations are not operation failures.

Problem	Time of Occurrence	Cause
Unit does not run.	When unit is started immediately after just being turned off.	Overload protection switch causes a 3 minute delay.
	When power is turned on.	Start up could be delayed up to 1 minute.
Mist comes from the unit.	During operation.	If the unit is running under high humidity, the wet air in the room will be quickly cooled down.
The unit generates noise.	Slight cracking sound is heard when unit is turned on.	Electronic expansion valve initialization can cause this noise temporarily.
	There is a continuous sound when cooling.	Gas refrigerant flow can cause a slight noise.
	The unit makes a sound when it starts or stops.	Gas refrigerant flow can cause a slight noise.
	There is slight and continuous sound when unit is running or after running.	The drainage system can cause this noise during operation.
Dust comes from the unit.	When unit is run after a long period of not being used.	Dust has settled inside the indoor unit and is dispersed from the unit.
The unit emits odor.	During operation.	Smells from the operating environment may be pulled through the air handler.
Indoor unit still runs after being switched off.	After every indoor unit receives a "stop" signal, the fan will continue running.	Indoor fan can be set as "ON" or "AUTO" mode. Under "ON" mode, indoor fan will continue running after switching off the unit.

Error Code



WARNING

- When abnormalities occur, stop the unit immediately and disconnect power. Contact the MRCOOL® technical department at the number below. If the unit continues to run abnormally, it may damage the unit and cause an electric shock and/or a fire hazard.
- ⚠ **DO NOT attempt repairs to the appliance yourself. Improper repair and maintenance can create electric shock and fire hazards. Please contact MRCOOL® Tech Support, at (270) 366-0457, for further guidance or a qualified professional for repairs.**

If the display panel or wired control displays an error code, please refer to the table on the following page.

Error Code

If the display panel or wired control displays an error code, please refer to the following table:

Number	Error Code	Error
1	E1	Compressor high pressure protection
2	E3	Compressor low pressure protection
3	E4	Compressor air discharge high-temperature protection
4	F2	Condenser temperature sensor error
5	F3	Outdoor ambient temperature sensor error
6	F4	Discharge temperature sensor error
7	F6	Outdoor unit tube temperature sensor error
8	EE	Outdoor unit memory chip error
9	H4	Overload
10	H5	IPM protection
11	H6	DC fan error
12	H7	Driver out-of-step protection
13	HC	Pfc protection
14	Lc	Startup failure
15	P0	Drive reset protection
16	P5	Over-current protection
17	P6	Master control and driver communication error
18	P7	Driver module sensor error
19	P8	Driver module high temperature protection
20	PA	AC current protection
21	Pc	Driver current error
22	PL	Bus low-voltage protection
23	PH	Bus high-voltage protection
24	PU	Charge loop error
25	ee	Driver memory chip error
26	e1	High pressure sensor error
27	C4	ODU jumper cap error

NOTICE

When the unit is connected with the wired controller, the error code will show simultaneously on it.

Regular checks, maintenance, and care should be performed by professional personnel, which will prolong the life span of the unit.

Drain Pipe

Regularly check the drain pipe for leaks and clogs in order to ensure smooth condensate drainage.

Notice Before Seasonal Use

1. Check the inlet/outlet of the indoor unit and ensure it is not clogged.
2. Check the ground wire and ensure it is securely connected.
3. Check if the filter screen has been installed correctly.
4. Check and ensure the unit is installed firmly and securely.
5. If there is something abnormal, please contact the local appointed service center.

Maintenance After Seasonal Use

1. Cut off the main power supply of the unit.
2. Clean the filter screen of indoor units.
3. Clean the dust from the indoor units.
4. In the event of rust and corrosion, use anti-rust paint to stop it from continuing to spread.

Parts Replacement

Purchase replacement parts from local appointed service center or dealer if necessary.

After-Sales Service

If the air-conditioning unit you purchased has any quality problem or you have any inquiry, please contact the MRCOOL® Tech Support, at (270) 366-0457.

Warranty should meet the following requirements:

1. Initial startup and first run of the unit should be performed by professional personnel from a factory appointed service center.
2. Only factory manufactured accessories should be used on the machine.
3. All the instructions listed in this manual should be followed completely.
4. The warranty will be automatically voided if any of the above requirements are not met.

This appliance contains refrigerant and other potentially hazardous materials. When disposing of this appliance, the law requires special collection and treatment.

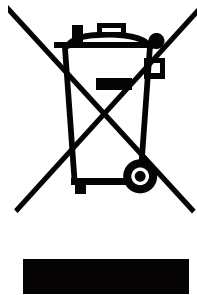
⊘ ***DO NOT* dispose of this product as household waste or unsorted municipal waste.**

When disposing of this appliance, you have the following options:

- Dispose of the appliance at a designated municipal electronic waste collection facility.
- When buying a new appliance, the retailer will receive the old appliance free of charge.
- The manufacturer will receive the old appliance free of charge.
- Sell the appliance to certified scrap metal dealers.

Special notice

Disposing of this appliance in the forest or other natural surroundings not only endangers your health, but is also bad for the environment. Hazardous substances may leak into the ground water and enter the food chain.





MRCOOL®

COMFORT MADE SIMPLE

Universal® Series

ELECTRICIAN and/or HVAC TECHNICIAN:

LICENSE #:

INSTALLATION DATE:

INSTALLATION LOCATION:

SERIAL NUMBER: