



Ceiling Mount Air Handler Manual



Models: CMAH12, CMAH18, CMAH24, CMAH30,
CMAH36, CMAH48, CMAH60

Revised: September 2015

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Warranty Information

Thank you for choosing the Ceiling Mount Air Handler by Surna. Because your air handler is built with leading technologies and the highest quality components, with proper care and maintenance, it will provide you with years of worry free service. Please examine the unit upon arrival to be sure there is no damage as a result of shipping. If shipping damage has occurred, please note the damage on the receiving slip, and contact Surna immediately.

If you are missing parts or believe that you have a warranty issue, DO NOT return this item to the store of purchase. You must contact Surna at 303-993-5271 for troubleshooting and service instructions.

Limited Warranty

A 90-day all-inclusive warranty for: parts, labor, and shipping. Choice of repair facility and technician is at the discretion of Surna.

A 1-year warranty on any defective part is also provided. Choice of repair facility and technician is at the discretion of the air handler owner, although Surna is happy to assist with locating a technician. If Surna chooses the technician, limited labor coverage may apply.

Note: Extended warranty for parts, labor and shipping are available for purchase for a nominal fee. Contact Surna within 15 days of your air handler's arrival if you would like to purchase an extended warranty.

Limitation of Liability

To the extent allowable under applicable law, Surna's liability for consequential and incidental damages is expressly disclaimed. Surna's liability in all events is limited to and shall not exceed the cost of repair. Shipping damage is not covered under warranty. In the event that the item(s) arrive with shipping damage, Surna will assist with the repair or replacement of the damaged item ONLY if the damage is noted on the delivery receipt.

Warranty Disclaimer

Surna provides product information in this literature for the sole purpose of identification, and does not state or imply that the products are merchantable, or fit for a particular purpose, or that the products will conform to the descriptions.

Product Suitability

Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While Surna attempts to ensure that its products comply with such codes, it cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, review the product applications, and all applicable national and local codes and be sure that the product, installation and use will comply with them.

Service Under Warranty

This product is warranted by Surna against defects due to fault in workmanship or materials.

If the product has been damaged under normal use, it will be entitled to warranty service of the type described and within the timeframes outlined. Damage caused by abnormal use, or after the timeframes outlined have expired, carry no such guarantee. Service under warranty is provided only upon presentation of reasonable evidence (purchase receipt) that the date of claim is within the warranty period.

Service NOT Under Warranty

The warranty is not valid if the defect is due to accidental damage, misuse, shipping damage, neglect, or in the case of alterations or repair carried out by unauthorized persons. Surna can, at its discretion, assist the consumer with shipping claims in the case of damage incurred during shipping, so long as the customer follows the instructions outlined above.

Surna Ceiling Mount Air Handler Parts List

Below is a list of all parts provided with each Ceiling Mount Air Handler.

1. Surna Ceiling Mount Air Handler Manual
2. Ceiling Mount Air Handler
3. Flow Meter

Routine Maintenance

This product is designed to provide many years of dependable, trouble free comfort when properly maintained. Proper maintenance will consist of routine filter cleanings/changes, biannual check-ups that include (but are not limited to); filter inspections, electric heater inspections/cleaning of the internal electrical and heat transfer components by a qualified service technician. Failure to provide periodic check-ups and cleaning can result in excessive operating cost and/or equipment failure.



2. Ceiling Mount Air Handler



3. Flow Meter (front and side view)

Warnings

Safety Symbols Used



CAUTION: Important information, consult product manual and read the provided instructions carefully.



WARNING: Potential electric shock hazard.



Protective Earth Connection



Action Prohibited

Air Handler Safety Guide



Please read the information in this document carefully prior to attempting the installation, operation and/or servicing of the air handler unit. This document contains all information required to install and operate the Surna Ceiling Mount air handling devices. Failure to follow the directions provided herein may impair the safeties provided and could cause damage to the air handler equipment and or accessory equipment, damage to building facilities, and/or cause serious injury or death to the operator. Please adhere to all applicable safety guideline requirements in this document and all applicable electrical and mechanical jurisdictional codes.



Prior to providing power to the equipment, be sure to inspect the area for water spills, which may present a shock hazard to the user. Take extra care to mount accessory electrical equipment away from areas regularly exposed to water and be sure to provide secure wire and cable routing to protect personnel from shock hazards.



Only operate the equipment with an appropriately sized breaker in place and wire sizes with adequate current carrying capacity. Consult with an electrician before attempting electrical installation.



Using Surna Air Handler equipment in a manner not described in this manual may void its warranty and any safeties provided herein.



Following unit installation and maintenance activities, the user shall observe the system operation to verify that normal operation has resumed prior to leaving the equipment to operate unattended.



Only use parts provided with, or specified for use with, the air handler equipment.



CAUTION Care must be taken when handling sheet metal. Sheet metal parts have sharp edges and could cause injury.



The components of this fan coil have been inspected at the factory and readied for shipment. Upon receiving the shipment a visual inspection of the packaging must be performed.



Care must be taken to ensure the structural integrity of the supporting members when mounting these devices. Verify that the load bearing capacity of any mounting surface is rated for the load of the air handler.



DO NOT Use Ethylene Glycol with this system. Only Propylene Glycol is to be used at prescribed mixture ratios.



Adequate clearance shall be provided around the unit for regular servicing. After installation, service and maintenance personnel shall be able to access the power supply, coil connections and condensate drain.



This unit must be connected to a protective earthing system prior to operation. DO NOT remove the grounded connection while power is being supplied to the Surna air handling equipment. Doing so presents an electric shock hazard to users and service personnel.

Installation Instructions

Mechanical Installation

This air handler unit is designed to be mounted in a horizontal configuration only. The weight information for each model can be found in the Specifications section of this document; take care to ensure the supporting members are rated to support the air handler load. See the Specifications section of this document for the hanging weights of the fan coils. When installing, clearances must be provided as a provision to allow servicing of the unit. Ensure that adequate space is available to facilitate servicing of the power supply, coil connections, and condensate drain.

Return and Supply Air Connections

Supply and return air does not require connection of any kind for the air handler to function properly as the air handler will draw warm air in from the garden and exhaust cold air back into the garden without additional ducting. The unit is supplied without air filtration components. It is acceptable to operate the unit without filtration, however the condensing coils must be cleaned with a gentle water spray at least on a quarterly basis. Failure to clean condensing coils periodically can result in reduced cooling efficiency.

Alternatively, a box of sheet metal can be constructed around the blowers where a standard air conditioning filter may be installed. We recommend a filter size of at least 18" x 36" on air handlers that are 2-tons or smaller and at least two filters of 18" x 24" on larger units. This will ensure proper and unrestricted air flow over the condensing coils.

Wiring

WARNING: Turn off the breaker until all electrical connections are made.

WARNING: This unit must be connected to a protective grounding system.

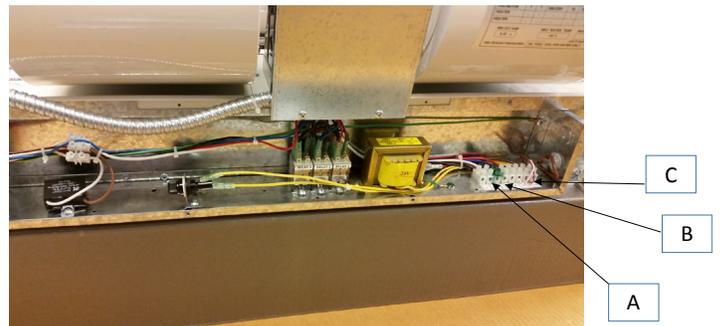
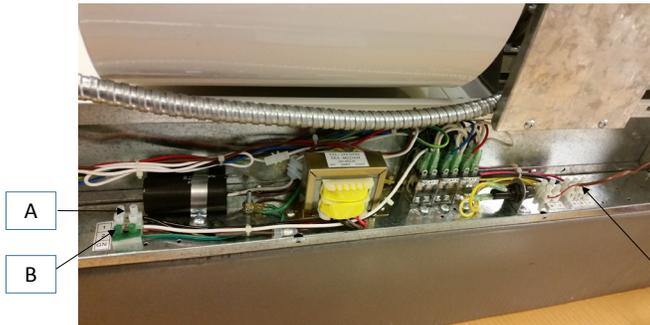
All wiring shall comply with local and national codes. Before attempting system installation, verify that the electrical system and wiring are adequate for supplying the required ampacity to the air handler unit at 208/230 VAC. High and low voltage terminal blocks are provided in the

unit's electrical panel whose termination points are detailed in the wiring diagram at the end of this document. For wire sizing, refer to the air handler specifications section of this document for specific air handler model ampacities. If you aren't familiar with local building codes and standard electrical practices, You **MUST** employ the services of a qualified electrician prior to installing and operating the equipment. Making improper electrical connections could cause damage to the equipment or harm to servicing personnel.

Installation Connections

These units are often wired differently. Here are two examples to give you an idea of where to look.

Installation Connections
A – High Voltage Terminal Block
B – Grounding Terminal
C – Low Voltage Terminal Block



Plumbing

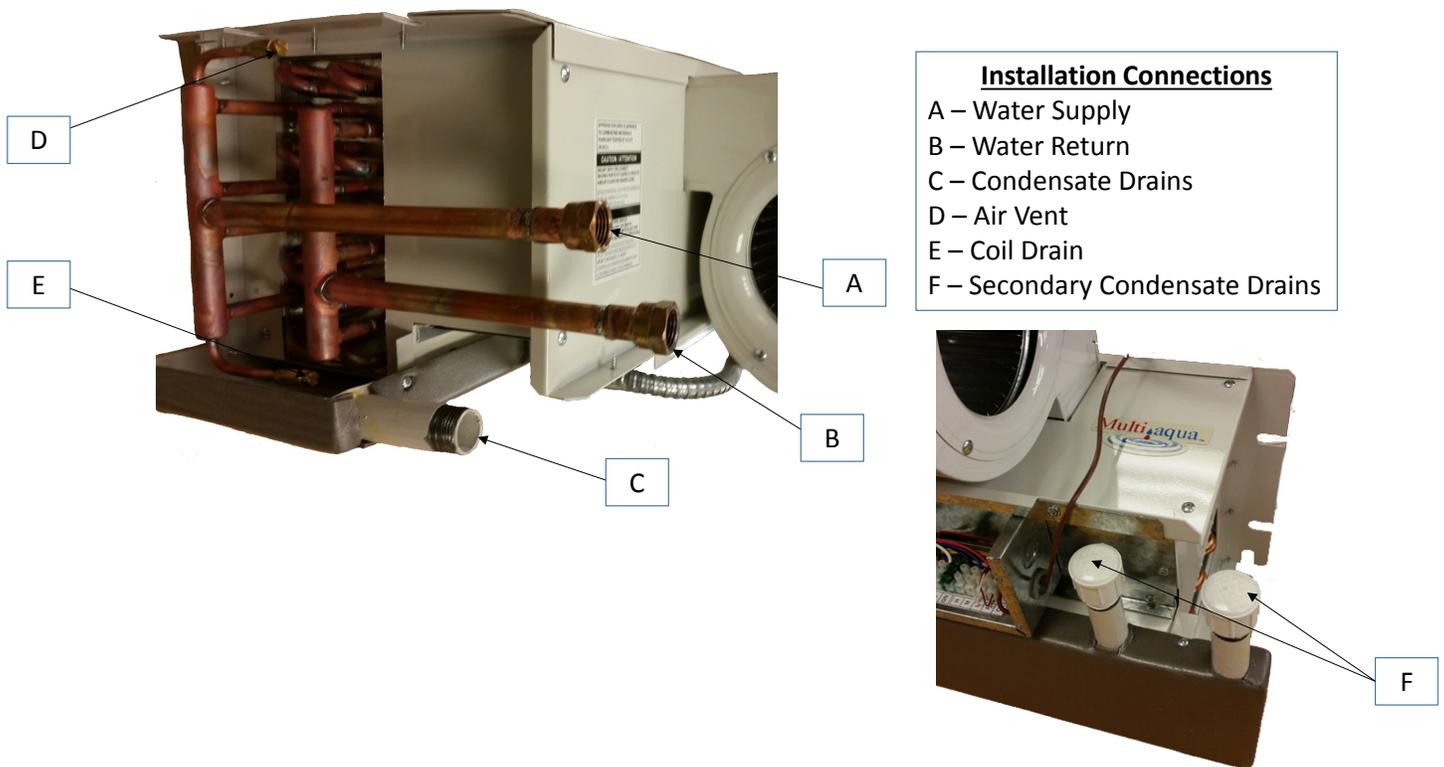
The air handler units has a dedicated water inlet connection and a dedicated water outlet connection. When installing these connections, take care to verify that these connections are not reversed, or the unit will not operate properly. Refer to the Specifications section of this document for water connection sizes and types. Proper insulation shall be provided for the water lines in accordance with local and national building codes.

The fan coil unit has one condensate drain connection on either side of the drain pan for either left or right hand drain connection. The opposite drain connection not being used must be capped off by the installing contractor. The middle drain connection is the safety condensate drain connection. Ensure that all condensate drain lines have at least one quarter of an inch of fall per foot for proper drainage and install P-Traps to avoid air lock.

The fan coil unit also comes with a manual air bleed and a manual coil drain fitting. They are located on the same side as the supply and return water line connections. The water supply line is connected to the coil connection furthest away from the fans. The water return line is connected to the coil connection closest to the fans. Ensure that both the supply and return water lines are insulated to prevent them from sweating.

Following plumbing installation, the system should be checked for leaks prior to attempting unattended operation of the system.

Plumbing Connections



Important Plumbing Tips

1. Total manifold size and length will vary depending on specific circumstances, number of air handlers, etc. Choose a supply size that is sufficient for the flow rates of all equipment supplied by the manifold.

2. The return manifold should be sized a minimum of ¼" larger than the supply manifold.

3. Install shut off valves at the main supply manifold and a shut off valve at each air handler. This allows you to take individual air handlers out of the cooling loop should servicing be necessary.

4. Install a fresh water bypass on the main supply manifold. This allows you to use a municipal water supply for cooling should your chiller require servicing.

5. Use only long turn 90's whenever possible to avoid restriction of the water supply.

6. Insulate all supply and return lines to avoid condensation outside the air handler(s).

7. Flow rate requirements for these air handlers is 2.5 GPM (Gallons Per Minute) per ton. For example, a 5-Ton air handler requires 12.5 GPM to operate efficiently. A higher flow rate in this range will increase the cooling efficiency of the unit.

8 The air handler water outlet is ¾" NPT. The inlet is either ½" NPT (when ducted intake plenums are in use) or ¾" NPT (when ducted intake plenums are not in use).

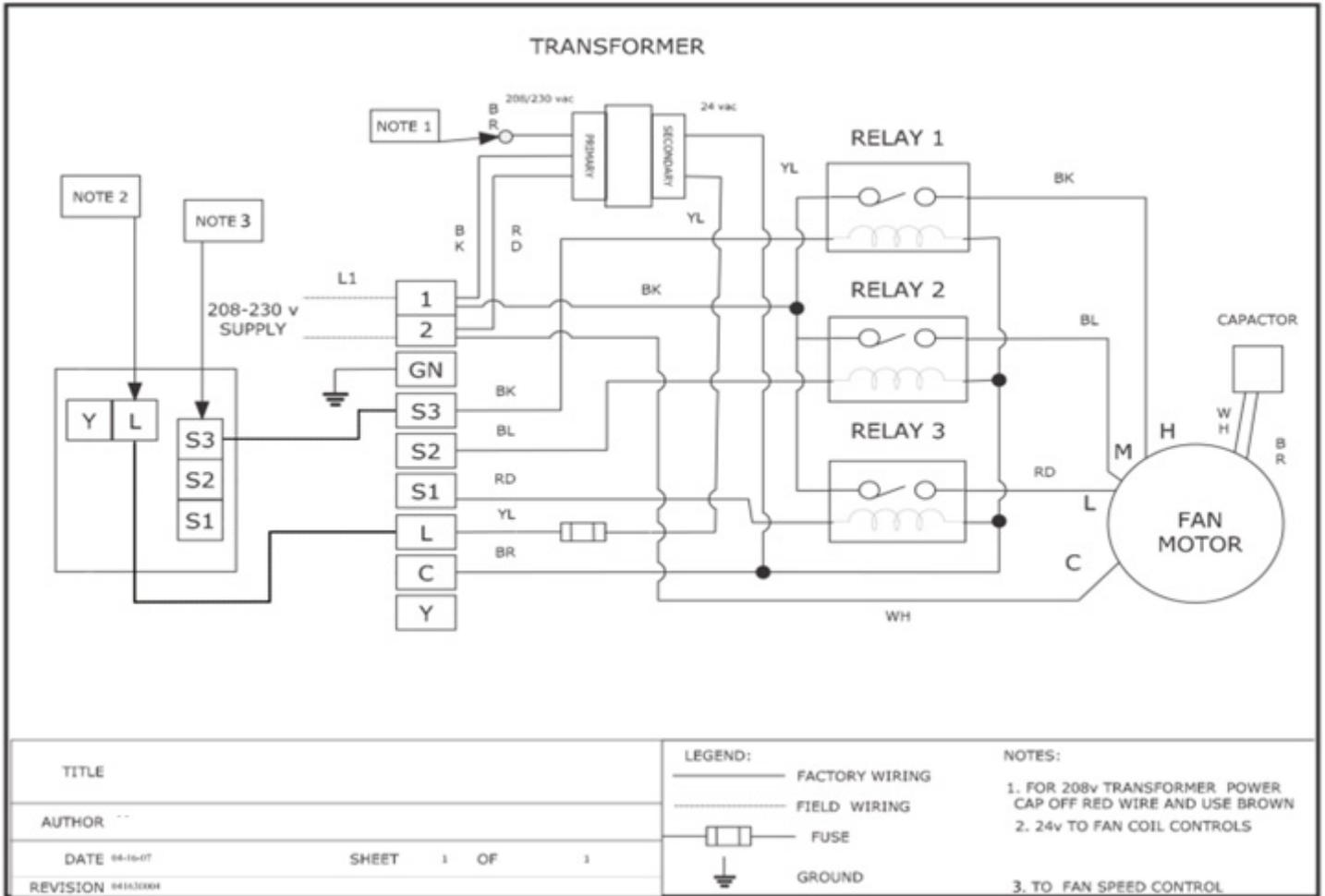
9. The air handler is marked with "IN" and "OUT" water connections for proper direction of flow. The unit will not operate properly if these connections are reversed.

10. Chiller temperature should be set at 55°F (13°C) to start. Adjust the temperature up or down from here depending on specific circumstances. Do not adjust the chillers set-point temperature below 45°F (7°C).

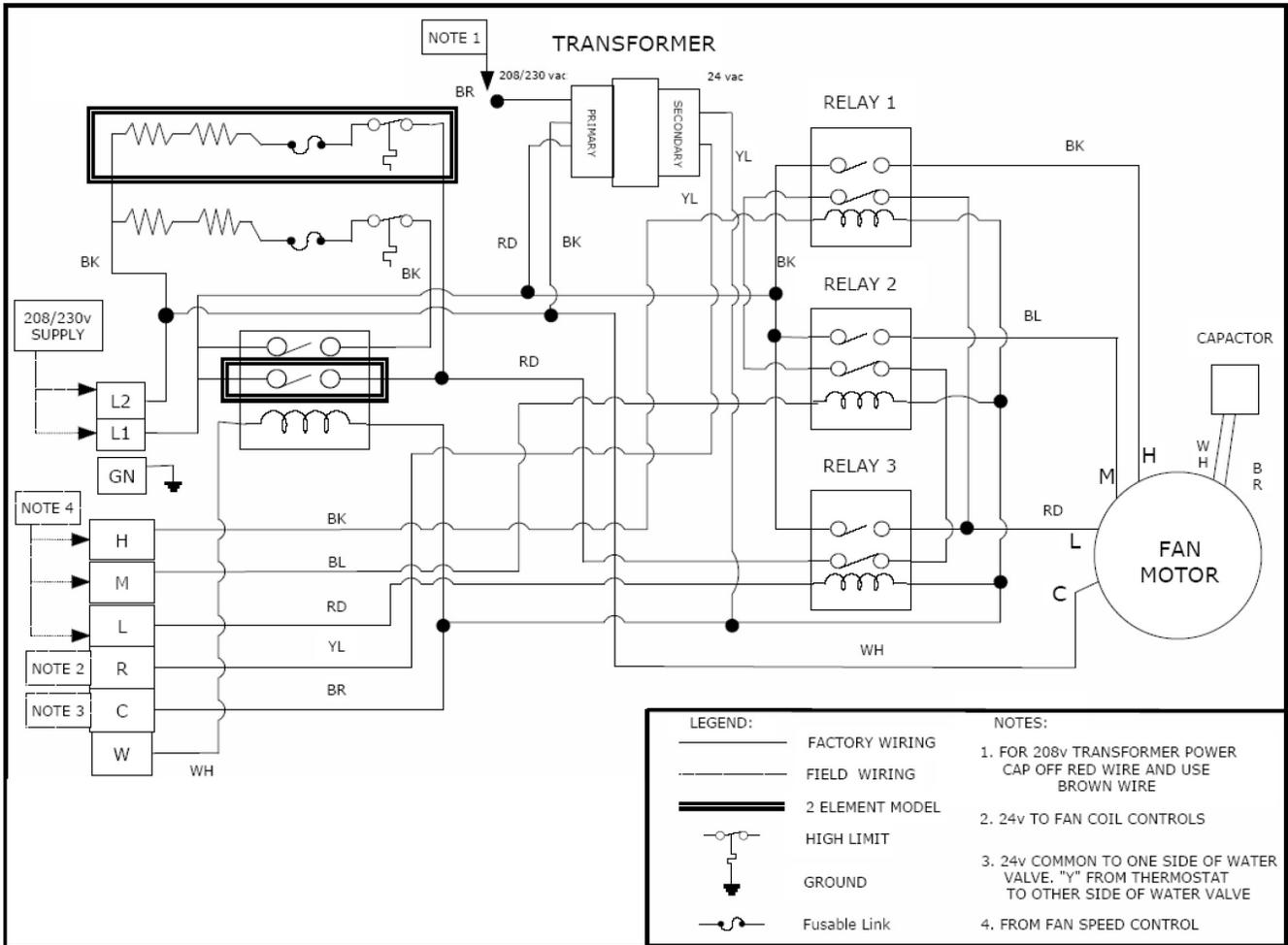
11. Propylene Glycol should be utilized at a minimum of 30%/70% (glycol/water) solution. This prohibits freezing and acts as a system lubricant/anti-corrosive to keep the chiller and air handlers working at peak performance. DO NOT use Ethylene Glycol (standard car antifreeze).

12. Once all plumbing is complete, start the system with clean water to flush out all residue from the system and to check the water circuit(s) for leaks. After running for roughly 5 minutes, drain the water from the system, correct leaks as necessary, and refill with the prescribed glycol/water mixture (see mixture requirements above). Turn on the system and top off the reservoir as needed.

Wiring Diagram



With Optional Heat Kit



System Specifications

Surna Ceiling Mount Air Handler System Specifications

| Model # | Description | Electric Heat | Height (in) | Length (in) | Depth (in) | Weight (Lbs) | Water Inlet (in) | Water Outlet (in) | Condensation Drain (In) | Nominal CFM | Volts/Phase/Hz | Motor HP | Full Load Amps | Minimum Circuit Amps | Maximum Amps |
|----------|--------------------------|---------------|-------------|-------------|------------|--------------|------------------|-------------------|-------------------------|-------------|-----------------|----------|----------------|----------------------|--------------|
| CMAH12 | Horizontal Mount 1 Ton | None | 10.25 | 37.72 | 21.65 | 66 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 400 | 208/230-1-50/60 | 1/8 | 0.82 | 1.03 | 3 |
| CMAH12-3 | Horizontal Mount 1 Ton | 3 kW | 10.25 | 37.72 | 21.65 | 66 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 400 | 208/230-1-50/60 | 1/8 | 13.86 | 19.31 | 20 |
| CMAH12-5 | Horizontal Mount 1 Ton | 5 kW | 10.25 | 37.72 | 21.65 | 66 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 400 | 208/230-1-50/60 | 1/8 | 22.56 | 31.6 | 35 |
| CMAH12-6 | Horizontal Mount 1 Ton | 6 kW | 10.25 | 37.72 | 21.65 | 66 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 400 | 208/230-1-50/60 | 1/8 | 26.9 | 37.6 | 40 |
| CMAH12-8 | Horizontal Mount 1 Ton | 8 kW | 10.25 | 37.72 | 21.65 | 66 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 400 | 208/230-1-50/60 | 1/8 | 35.6 | 48.3 | 50 |
| CMAH18 | Horizontal Mount 1.5 Ton | None | 10.25 | 37.72 | 21.65 | 68.2 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 600 | 208/230-1-50/60 | 1/8 | 1.18 | 1.48 | 3 |
| CMAH18-3 | Horizontal Mount 1.5 Ton | 3 kW | 10.25 | 37.72 | 21.65 | 68.2 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 600 | 208/230-1-50/60 | 1/8 | 14.22 | 19.76 | 20 |
| CMAH18-5 | Horizontal Mount 1.5 Ton | 5 kW | 10.25 | 37.72 | 21.65 | 68.2 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 600 | 208/230-1-50/60 | 1/8 | 22.92 | 32.05 | 35 |
| CMAH18-6 | Horizontal Mount 1.5 Ton | 6 kW | 10.25 | 37.72 | 21.65 | 68.2 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 600 | 208/230-1-50/60 | 1/8 | 27.27 | 38.05 | 40 |
| CMAH18-8 | Horizontal Mount 1.5 Ton | 8 kW | 10.25 | 37.72 | 21.65 | 68.2 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 600 | 208/230-1-50/60 | 1/8 | 35.96 | 48.75 | 50 |
| CMAH24 | Horizontal Mount 2 Ton | None | 10.25 | 37.72 | 21.65 | 72.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 800 | 208/230-1-50/60 | 1/4 | 1.43 | 1.8 | 4 |
| CMAH24-3 | Horizontal Mount 2 Ton | 3 kW | 10.25 | 37.72 | 21.65 | 72.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 800 | 208/230-1-50/60 | 1/4 | 14.47 | 20.08 | 20 |
| CMAH24-5 | Horizontal Mount 2 Ton | 5 kW | 10.25 | 37.72 | 21.65 | 72.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 800 | 208/230-1-50/60 | 1/4 | 23.17 | 32.36 | 35 |
| CMAH24-6 | Horizontal Mount 2 Ton | 6 kW | 10.25 | 37.72 | 21.65 | 72.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 800 | 208/230-1-50/60 | 1/4 | 27.52 | 38.36 | 40 |
| CMAH24-8 | Horizontal Mount 2 Ton | 8 kW | 10.25 | 37.72 | 21.65 | 72.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 800 | 208/230-1-50/60 | 1/4 | 36.21 | 49.06 | 50 |
| CMAH30 | Horizontal Mount 2.5 Ton | None | 10.25 | 43.7 | 21.65 | 74.8 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1000 | 208/230-1-50/60 | 1/4 | 1.43 | 1.8 | 4 |
| CMAH30-3 | Horizontal Mount 2.5 Ton | 3 kW | 10.25 | 43.7 | 21.65 | 74.8 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1000 | 208/230-1-50/60 | 1/4 | 14.47 | 20.08 | 20 |
| CMAH30-5 | Horizontal Mount 2.5 Ton | 5 kW | 10.25 | 43.7 | 21.65 | 74.8 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1000 | 208/230-1-50/60 | 1/4 | 23.17 | 32.36 | 35 |
| CMAH30-6 | Horizontal Mount 2.5 Ton | 6 kW | 10.25 | 43.7 | 21.65 | 74.8 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1000 | 208/230-1-50/60 | 1/4 | 27.52 | 38.36 | 40 |
| CMAH30-8 | Horizontal Mount 2.5 Ton | 8 kW | 10.25 | 43.7 | 21.65 | 74.8 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1000 | 208/230-1-50/60 | 1/4 | 36.21 | 49.06 | 50 |
| CMAH36 | Horizontal Mount 3 Ton | None | 10.25 | 49.68 | 21.65 | 83.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1200 | 208/230-1-50/60 | 1/4 | 1.81 | 2.26 | 5 |
| CMAH36-3 | Horizontal Mount 3 Ton | 3 kW | 10.25 | 49.68 | 21.65 | 83.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1200 | 208/230-1-50/60 | 1/4 | 14.85 | 20.55 | 20 |
| CMAH36-5 | Horizontal Mount 3 Ton | 5 kW | 10.25 | 49.68 | 21.65 | 83.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1200 | 208/230-1-50/60 | 1/4 | 23.55 | 32.84 | 35 |
| CMAH36-6 | Horizontal Mount 3 Ton | 6 kW | 10.25 | 49.68 | 21.65 | 83.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1200 | 208/230-1-50/60 | 1/4 | 27.9 | 38.84 | 40 |
| CMAH36-8 | Horizontal Mount 3 Ton | 8 kW | 10.25 | 49.68 | 21.65 | 83.6 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1200 | 208/230-1-50/60 | 1/4 | 36.6 | 49.54 | 50 |
| CMAH48 | Horizontal Mount 4 Ton | None | 13.78 | 48.5 | 20 | 68.34 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 1600 | 208/230-1-50/60 | 1/2 | 2.72 | 3.4 | 8 |
| CMAH60 | Horizontal Mount 5 Ton | None | 13.78 | 56.1 | 20 | 72.8 | 3/4 MIP | 3/4 MIP | 3/4 FIP | 2000 | 208/230-1-50/60 | 1/2 | 2.72 | 3.4 | 8 |



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