



**INSTALLATION AND MAINTENANCE INSTRUCTIONS FOR  
ROOFTOP UNITS**

**SIZES FROM 600 CFM TO 9,000 CFM**





## **INTRODUCTION**

**READ THE ENTIRE INSTALLATION, OPERATION AND MAINTENANCE MANUAL. OTHER IMPORTANT SAFETY PRECAUTIONS ARE PROVIDED THROUGHOUT THIS MANUAL.**

The following information is to be used by the installer as a guide. Since each installation is unique, only general topics are covered. To order in which topics are presented may not be those required by the actual installation.

This guide does not supersede or circumvent any applicable national, state or local code.

The installer must read the entire contents of this guide and develop a thorough understanding before beginning installation.

Note: Due to continued product research and development, Commercial Aire Products reserves the right to discontinue or change without notice, any or all specifications or designs without incurring obligations.

## **INSPECTION**

### **Receiving Unit**

When received, the unit should be checked for damage that might have occurred in transit. If damage is found it should be noted on the carrier's Freight Bill. A request for inspection by carrier's agent should be made in writing at once. All our sales are FOB our warehouse in Fort Worth Texas and any in transit damage is carrier responsibility.

Nameplate should be checked to ensure the correct model sizes and voltages have been received to match the job requirements.

If repairs must be made to damaged goods, then the factory should be notified before any repair action is taken in order to protect the warranty. Certain equipment alteration, repair, and manipulation of equipment without the manufacturer's consent may void the product warranty. Contact the MORTEX MANUFACTURING Warranty Department for assistance with handling damaged goods, repairs, and freight claims: (817) 624-0820 ext 225.

**Note:** Upon receipt check shipment for items that ship loose such as filters and remote sensors. Consult order and shipment documentation to identify potential loose-shipped items. Loose-shipped items may have been placed inside unit cabinet for security. Installers and owners should secure all doors with locks or nuts and bolts to prevent unauthorized access

Thoroughly inspect all packages upon receipt of product. Ensure pallet(s) have not been dropped, crushed or punctured. Inspect all contents for damage. If damage is found, immediately file a claim with the delivering freight carrier

### **Storage**

This equipment is not suitable for outdoor storage. If installation will not occur immediately following delivery, store equipment in a dry protected area away from construction traffic and in the proper orientation as marked on the packaging with all internal packaging in place. Secure all loose-shipped items.



## **SAFETY**

The installation and/or servicing of comfort conditioning equipment can be hazardous due to system pressures and electrical devices.

**ONLY TRAINED/QUALIFIED PERSONNEL SHOULD PERFORM SERVICE AND/OR INSTALLATION  
OBSERVE ALL PRECAUTIONS AND WARNINGS IN PRODUCT DATA OR INSTRUCTIONS ON UNIT.  
FOLLOW ALL SAFETY CODES.**

**Wear eye protection and gloves. Have a fire extinguisher readily available.**

**DISCONNECT ALL POWER SUPPLIES BEFORE REMOVING ANY PANELS.**

**DISCONNECTING MORE THAN ONE POWER SUPPLY MAY BE REQUIRED FOR SOME EQUIPMENT.**

### ***Locating the Unit***

Placement of the unit relative to ductwork, electrical and plumbing must be carefully considered. Return air plenum or duct can be mounted directly to the return air flanges. Use flexible gasket material to seal the duct to the unit.

Verify floor, foundation or suspension support can support the total unit weight, including accessory weights. Unit must be level in both horizontal axes to support the unit and reduce noise and vibration from the unit.

Allow adequate service clearances as shown on the unit nameplate and unit drawing. Consult your local building codes for additional service clearance requirements.

Allow adequate space for piping access and panel removal. Condenser water piping and condensate drain connections are located on either side of the unit.

### ***Suspended Units***

Horizontal air handling units are equipped for suspended installations. The unit should be lifted into position by supporting the unit with the skid used for shipping. The air handling unit must be installed level and care should be taken to prevent damage to the cabinet. Other installation provisions may be necessary according to job specifications.

### ***LIFTING AND HANDLING THE UNIT***

Horizontal, Vertical and Modular Units have channels underneath the base which provide lifting access to the underside of the unit and allow moving without physical damage.

Before lifting the unit, be sure that all the shipping materials has been removed.

Incorrect lifting can cause damage to the unit, injury or death. Lifting equipment capacity should exceed unit weight by an adequate safety factor. Always test lift unit not more than 24 inches to verify the proper center of gravity lift point.

### ***Duct Heaters Installation***

Our duct heaters may be used with heat pumps, cooling units or force air systems. They are suitable for zero clearance installations in vertical or horizontal duct systems.

#### ***Duct Heaters Installation Guidelines:***

- 1- Install it at least 4 Ft. Downstream from air source or elbow. If closer than 4 Ft. may require turning vanes, baffles or other devices to assure an even distribution of air over the heater.
- 2- Install at least 2 Ft. before an elbow or may require devices as #1
- 3- Transitions to and from a duct heater should be limited to 20% of the duct area per linear foot.
- 4- Always mount in the side of a vertical or horizontal duct. **NEVER MOUNT FROM TOP OR BOTTOM OF A HORIZONTAL DUCT.**



- 5- All duct materials must be suitable for 250 ° F operation.
- 6- The air duct should be installed in accordance with the standards of the NFPA for installation of air conditioning and ventilating systems pamphlet No. 90A and 90B.
- 7- Locate the heater so that it is completely accessible and normal ventilation is assured.
- 8- The amount of air curtain between the heater elements and limit switches must not be reduced by internal duct liner within 1 ft before or after the heater. In fiber glass duct systems, a metal sleeve inside the duct to support the heater must be used. If the base of the heater is not flush with the air stream, nuisance cycling may result.
- 9- Field connected wires entering the heater controls compartment must be copper suitable for 75 ° C ( 167 ° F ) Field wire the supply and control circuits in accord with the National and Local Codes and use the wiring diagram supply with each heater as a guide. The heater must not operate unless the fan is on. Never use a fan delay with these heaters.

### **START UP LIST FOR DUCT HEATERS**

1.) Electric duct heater must be installed according to manufacturer's installation instruction manual and must be in compliance with all NEC, local and state codes.

Failure to observe all of the installation guide lines will void the warranty and listing of the product.

2.) Review heater data information label found on outside of heater panel cover.

3.) Voltage, phase and frequency of heater must match heater data label. If field voltage and/or phase does not match heater data label, do not operate heater.

4.) The proper field wire size to heater must be used, copper conductors only. See wire size data label adjacent to heater terminal block or disconnect switch in heater. Heater must be properly ground to accommodate NEC guide lines. Failure to do so may result in shock or death.

5.) Ensure all electrical connections are tight before energizing heater circuit. #10-14 AWG should be 35 inch/pound and 8 AWG should be 40 inch / pound wiring in heater.

6.) Review the proper size disconnect means and / or fusing has been applied to heater power supply circuit Only qualified individuals experienced in proper installation of heating and cooling should perform any start-up operations of HVAC systems.

Turn disconnect switch (s) to the on position. Energize heater circuit with thermostat to 100% rating of heater KW rating. First start-up of heating element will burn off any element manufacturing oil that may cause some smoke in the air system.

7.) Using proper measuring devices to measure voltage to heater, line voltage should be plus or minus 5% of heater rated voltage. Never operate 208V rated heater on 240V line voltage. Measure line 1 to line 2 on single phase heaters and line 1 to neutral on 120V and 277V heaters.

On three phase heaters measure line 1 to line 3, line 2 to line 3 and line 1 to line 2 for proper line voltage. Measure amp draw on supply conductors to heater disconnect switch or terminal block, for proper amp draw with proper instruments. Amp draw must match heater data label with 100% heater is energized; reading should be plus or minus 3%.

8.) Air flow over heating elements must be even across the face of the heater. Duct system must have .08 minimum static pressure duct system 2

9.) Automatic reset will de-energize heater if heater is not installed to manufacturers duct installation manual or low air flow/uneven air across face of element.

Correction must be made to operate heater. Manual reset will also de-energized heater if there is low or uneven air flow over the heating elements. Air flow volume and / or reinstallation of heater must be done before energizing heater.

10.) If heater has a control transformer it may have a breaker in the circuit. If transformer is shorted, breaker will open the circuit. You must reset and find the cause of the short. If transformer has no breaker, it may have an inline fuse. A short circuit will open the transformer. Transformer must be replaced with an identical transformer.

11.) Air flow switch only proves that air flow exists, not that the minimum proper air flow does exist; standard air pressure switch set-up is for positive air pressure system.

Heaters in negative air system must have air tubing to air pressure switch relocated to the open port of the switch.

12.) After heater installation and operation has meet standards and heater data label, closed heater panel door and energized heater circuit.

### **Minimum Air Flow Requirements Across the heaters**

Each KW produces 3413 BTUH. Divide the total BTUH needed by 3413 to find the KW needed. Use the chart below to find the minimum air flow required. You will need to know the maximum inlet temperature of the heater. The outlet air from a Heat pump (sometimes 110 ° F) would be the inlet air to an auxiliary heater. You must also know the Kw per Sq. Ft. of the Minimum Duct Area (Kw/Sq. Ft. MDA) for the heater. An example is worked out below:

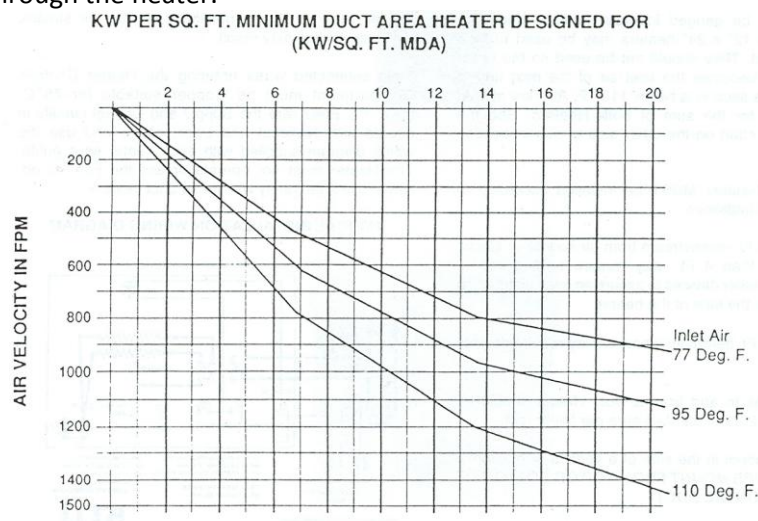
EXAMPLE: Using 12 KW Heater designed for minimum duct size 8" x 16" and being the only heat in an area. You expect inlet air to the heater will be 77 ° F Maximum.

8" x 16" divided by the .888 Sq. Ft. = 13.5 which is the Kw/Sq. Ft. MDA

Locate the 13.5 along the top side of the chart and from there draw a vertical line downward until the 77 ° F inlet air line is intersected. From point of intersection draw a horizontal line to the left side of the chart to the answer of 800 FPM (Velocity) of air minimum required over the heater.

To convert to CFM multiply the answer by the Sq. Ft. of the heater minimum duct area design. In the example 800 multiply by .888 would be 710 CFM.

These minimum air flow requirements should be met at any point over the face of the heater. If heaters are used in ducts larger than the heater minimum duct design, reliable means should be used to assure the proper air flow through the heater.



### **ELECTRIC DUCT HEATER MAINTENANCE GUIDE LINES**



In most cases electric duct heaters require very little maintenance or service during the life of the product. The duct heater must be installed according to our installation instruction manual and NEC / SMACNA guide lines.

- 1) Disconnect ALL power circuit(s) to heater before any service is to be performed, there may be more than one disconnect switch that needs to be in the off position.
- 2) All electrical connections to the heater power & control circuits should be tight. Inspect all electrical connections in heater, as they may become loose during operation. All wiring must be done in accordance with the National Electrical Codes and any applicable state & local codes.
- 3) All air filters in duct or unit system should be checked to ensure clean air is present with no restriction of air flow to heating elements. Always replace the filter with the same type as originally furnished.
- 4) Check the field voltage and phase rating is the same as the heater information data. Check full line amp draw of heater against rated heater data plate/label. Correct field wire size and grade must be used to heater power circuit(s). Heater must have proper grounded wire to heater.
- 5) Heater should be free and clean of dust /dirt and moisture in heater control panel.
- 6) Heater construction or wiring must not be modified or any alterations are preformed to change the heater construction. This would void the listing and warranty of the heater.
- 7) Replacing unauthorized components must be approved from the factory first, if not of the same part number and style. Safety automatic and manual resets MUST be of the same temperature, part number and vendor for proper heater operation. When higher rated temperature automatic/ manual resets are replaced in the heater circuit, this will void the listing and warranty and could cause damage or result in a fire.
- 8) Heater panel cover should not be removed or open during heater operation. Optimal operation of heater requires cleanliness.
- 9) Check operation of heater circuits with thermostat/ controller to ensure proper cycling of heater relays(s) and to the controller or thermostat set point.
- 10) If dust or other material is collecting on the heating elements, check filter(s) for replacement. The heater may have to be removed from duct section for cleaning. Use low pressure air to remove dust from heating element surfaces. Always wear eye protection and nose protection during this operation.
- 11) Do not try to repair any of the heater components, as they need to be replaced with original part number from vendor for safe operation of the heater. Do not file down the relay(s) contacts to stop relay chatter or to extend the life of the relay. Element male /female chassis insulators that are cracked or broken should be replaced with the same style and size. Insulators in the element support frame that are missing or broken must be replaced or replacement frame assembly should be ordered. Broken heating elements must replace with the same element gauge, ohms and outside diameter (O.D.) size.
- 12) Inspect all internal wiring in heater control panel for burned or broken wires. Replacement wiring must be rated for 105 C grades and of the same gauge for proper operation of heater.
- 13) Preventative maintenance to achieve maximum performance and service life of heater, a formal schedule of regular maintenance should be established and maintained.

### ***DUCT CONNECTIONS***

**Check existing duct insulation and vapor barriers.** Previously installed heating supply ductwork may already have adequate insulation against excessive heat loss. This insulation may be satisfactory for protection against heat gain from summer cooling. Depending on application, it may require additional insulation.

External insulated duct systems must have adequate vapor seal for summer operation, particularly where duct is exposed to high humidity conditions such as in attic, vented crawl space, unconditioned basement or utility room.



Remove any shipping material from the unit before installing the duct. Be sure that there are no material inside the unit that can damage the blower wheel when start running. Attach the duct to the flanges provided on the unit. The installer is responsible for sealing the ducts to the flanges to prevent any leak or contamination.

Ductwork should be sized according with the existing standards and installed following all the local and national codes. When attaching the duct to the unit, use a flexible connection to avoid vibrations on the duct. A three inches flexible connection is recommended.

#### **PRIOR TO START-UP**

Insure all shipping bolts, screws, and brackets are removed. Inspect all mounting bolts/screws on blowers, motor, coils and mounting brackets.

Check sheave and pulley to ensure alignment, check belt tension, and tighten all set screws.

Check for proper rotation of the blower pulley.

Exchanging two of the three leads at the motor can reverse three phase motor rotation. Note that not all installations will use starters.

Exchanging leads inside the motor junction box can reverse single phase motor rotation.(refer to motor data plate).

Ensure all filters are properly installed and free from construction debris.

Replace all doors, panels etc and check amperage draw of the motor. The amperage draw should not exceed the nameplate amps shown on the motor data plate.

#### **OPERATION AND MAINTENANCE**

##### **WARNING**

Disconnect electrical power to all circuits before servicing unit. Failure to do so may result in personal injury or death from electrical shock or moving parts.

**RETURN AIR FILTERS** – Filter access is from either side of unit. Inspect on a regular basis (at least monthly) and clean or replace.

##### **CAUTION**

Never operate unit without a filter or with filter access door removed. Damage to blower motor may result.

##### **WATER PIPING**

To check or clean, remove unit access panel, filter access door and filters. Use accepted industry methods for cleaning.

Remove all foreign matter from pan and condensate drain line. Check for rust or holes and repair as needed.

##### **BELT AND PULLEY –**

Proper pulley alignment and belt tension must be maintained at all times. Speed is reduced by adjusting pulley faces so they are farther apart; speed is increased with faces closer together. Check pulley setscrews and bolts.

##### **BLOWER RPM**

All our AHU are factory set to run at the specified cfm and static pressure, **we are not responsible for the design or field given conditions.** Contractor is responsible for the final balance and verification of the final installation conditions. Failure to do that, can cause blow off water from the coils and damage to the equipment and system due to excessive face velocity over the cooling coils.

The motor sheave is adjustable to allow some RPM field change; if major variation is needed, consult factory for the proper sheave pulley combination.

##### **MOTOR –**

Tighten motor mount bracket and base bolts as required.

**BLOWER** – Check bearings for wear. Replace as required. Check wheel for accumulation of dirt and clean as required.



**LIMITED WARRANTY**

Commercial Aire (CAP) warrants this product to be free from defects in factory workmanship and material for a term of ONE YEAR under normal use and service. CAP will, at its option, repair or replace any parts that prove to have such defects according to the terms outlined below. This warranty covers only the equipment described by the product Model and Serial Number listed below.

For your benefit and protection, fax this completed sheet to CAP at (817) 624-8581 promptly after installation. This will initiate the warranty period. In the absence of recorded warranty coverage, the warranty period will begin upon date of manufacture based upon the serial number provided. The warranty period for repair or replacement parts shall not exceed 2 years from date of manufacture. This warranty extends only to the original consumer purchaser and is non-transferable. For this warranty to apply the product must be installed according to CAP recommendations and specifications, and in accordance with all local, state, and national codes; and the product must not be removed from its place of original installation.

CAP strongly recommends regular periodic preventative maintenance on this equipment. A licensed contractor can ensure your maintenance program meets the conditions of the warranty, maximize the efficiency of the equipment, and service your unit within the mandated guidelines with regard to unlawful discharge of refrigerants into the atmosphere.

This warranty applies only to products installed in the United States and Canada.

For Owner's Information:

PRODUCT MODEL NO. \_\_\_\_\_ INSTALLATION DATE \_\_\_\_\_

UNIT SERIAL NO. \_\_\_\_\_ INSTALLED BY: \_\_\_\_\_

CONTRACTOR PHONE # \_\_\_\_\_ CONTRACTOR LICENSE # \_\_\_\_\_

**EXCLUSIONS**

This warranty does not cover any:

1. Shipping, labor, or material charges (including Refrigerant).
2. Damages resulting from transportation, installation, or servicing.
3. Damages resulting from: use of the product in a corrosive atmosphere; accident; abuse; fire; flood; alteration; or acts of God. Tampering, altering, defacing or removing the product serial number will void this warranty.
4. Damages resulting from inadequacy or interruption of electrical service or fuel supply, improper voltage conditions, Blown fuses, or other like damages.
5. Cleaning or replacement of filters.
6. Damages resulting from failure to properly and regularly clean air and/or water side of condenser and evaporator.
7. Damages resulting from: (a) freezing of condenser water or condensate; (b) inadequate or interrupted water supply; (c) Use of corrosive water; (d) fouling or restriction of the water circuit by foreign material or like causes.
8. Damages resulting from operation with inadequate supply of air or water.
9. Damages resulting from use of components or accessories not manufactured or approved by Commercial Aire.
10. Increase in fuel or electric cost.

This warranty is in lieu of all other warranties, expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose. Some states do not allow the disclaimer of implied warranty, so the preceding disclaimer may not apply. In states allowing only a partial limitation on implied warranties, the duration of implied warranties is expressly limited to the duration of the express warranty on the face hereof. In no event, whether as a result of breach of warranty or contract, tort (including negligence) strict liability or otherwise, shall CAP be liable of special, incidental, or consequential damages, including (but not limited to) loss of use of equipment or associated equipment, lost revenues, lost profits, cost of substitute equipment or cost of fuel or electricity.

The above limitations shall inure to the benefit of CAP suppliers and sub-contractors. The above limitation on consequential damage shall not apply to injuries to persons in the case of consumer goods. Some states do not allow the exclusion or limitation of liability for consequential, or incidental damages, or for strict liability in tort, so the above exclusions and limitations may not apply.

CAP does not assume or authorize any person to assume for CAP any other liability for the sale of CAP product. This warranty gives you specific legal rights. You may also have other rights, which vary from state to state.

The above warranty applies with respect to parts only and not labor. Accordingly, subject to the conditions and limitations set forth herein, the above warrant entitles the Customer only to receive a repaired or replacement part and not to the installation thereof. However, for the first one (1) year only of the above warranty period, CAP will provide labor services to repair a Product or install repaired or replacement parts at its designated repair facilities, or at its option, **compensate its authorized dealers and authorized contractors at CAP's standard fixed rates then in effect (irrespective of charges actually imposed and time actually expended) to provide such services**

The above warranty is for repair or replacement only. Except to that limited extent, CAP will not under any circumstances be liable for any loss, cost, damage, or expense of any kind arising out of a breach of this warranty or otherwise. Without intending to limit the foregoing sentence, it is specifically provided as follows: CAP SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, EXEMPLARY, SPECIAL, OR PUNITIVE DAMAGES, OR FOR ANY LOSS OF REVENUE, PROFIT OR USE, ARISING OUT OF A BREACH OF THIS WARRANTY (INCLUDING BUT NOT LIMITED TO DAMAGE RESULTING FROM CONDENSATE LEAKAGE) OR IN CONNECTION WITH THE SALE, MAINTENANCE, USE, OPERATION OR REPAIR OF ANY CAP PRODUCT. IN NO EVENT WILL CAP BE LIABLE FOR ANY AMOUNT GREATER THAN THE PURCHASE PRICE OF A DEFECTIVE PRODUCT.

Warranty 07/21/11





**INSTALLATION CHECK LIST**

Job Name: \_\_\_\_\_ Date: \_\_\_\_\_  
Address: \_\_\_\_\_  
Model: \_\_\_\_\_  
Serial: \_\_\_\_\_ Tag: \_\_\_\_\_  
Contractor: \_\_\_\_\_

**INITIAL CHECKLIST**

INSTALLING CONTRACTOR MUST VERIFY THE FOLLOWING ITEMS

- |                                                                          |          |         |
|--------------------------------------------------------------------------|----------|---------|
| 1- Did you check the unit for any visible shipping damage?               | YES? ___ | NO? ___ |
| 2- Is the unit installed properly level?                                 | YES? ___ | NO? ___ |
| 3- Are the clearances adequate for operation and service?                | YES? ___ | NO? ___ |
| 4- Can you open the access doors and removable panels?                   | YES? ___ | NO? ___ |
| 5- Have all the shipping braces and protections been removed?            | YES? ___ | NO? ___ |
| 6- Did you check the incoming voltage against the name plate?            | YES? ___ | NO? ___ |
| 7- Have all electrical connections been tested?                          | YES? ___ | NO? ___ |
| 8- Has over current protection been installed matching the requirements? | YES? ___ | NO? ___ |
| 9- Do the fan rotate freely?                                             | YES? ___ | NO? ___ |
| 10- Is copper tubing isolated from any metal parts?                      | YES? ___ | NO? ___ |
| 11- Are the filters clean and installed with the proper orientation?     | YES? ___ | NO? ___ |
| 12- Have the drain and p-trap checked and properly connected?            | YES? ___ | NO? ___ |

Ambient Dry Bulb Temperature \_\_\_\_\_ Ambient Wet Bulb Temperature \_\_\_\_\_

Supply Fan Details

Alignment Checked?	YES? ___	NO? ___
Rotation Checked?	YES? ___	NO? ___
Band Size _____		
Nameplate Amps _____	Actual Amps _____	
Motor RPM _____	Blower RPM _____	
Design CFM _____	Actual CFM _____	
Design ESP _____	Actual ESP _____	