Marley® Engineered Products

Models FC, SC, FT, ST, RFC and RFT

Open Coil and Finned Tube Duct Heaters



Open Coil Duct Heater



Open Coil Duct Heater for round duct



Finned Tube Duct Heater

Installation, Operation & Maintenance Instructions

IMPORTANT INSTRUCTIONS

WARNING

WHEN USING ELECTRIC APPLIANCES, BASIC PRECAUTIONS SHOULD ALWAYS BE FOLLOWED TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, AND INJURY TO PERSONS, INCLUDING THE FOLLOWING:

1. Do not operate without sufficient air flow. Insufficient airflow could result in overheating and subsequent damage may result.
2. DISCONNECT ALL POWER SOURCES before doing any work on the heater installation.
3. Do not connect aluminum supply wires to a standard duct heater. Order special line terminals that are suitable for aluminum conductors and are properly sized for the larger wire gauge they require.
4. Do not install standard heater outdoors. If heater will be subect to weather, specify raintight construction.
5. Do not bundle, tie or wrap power wiring. This may cause overheating and eventual breakdown of insulation.

SAVE THESE INSTRUCTIONS

INSTALLATION INSTRUCTIONS

Unpacking the Heater

1. Remove the shipping covers just before installation.
2. Inspect the heater carefully and report any damage to the manufacturer.

DO NOT INSTALL A DAMAGED HEATER.

Important Notes

⚠ WARNING ⚠

1. Do not install a duct heater in a vertical duct directly above a ceiling diffuser or an opening in the ceiling.
2. Do not install standard heaters outdoors. Order a heater with weatherproof control box instead.
3. Do not install spray humidifiers upstream of duct. Install it downstream instead.
4. Do not cover the control box with thermal insulating materials.
5. Use special air intake louvers of weatherproof construction for preheat duct heaters to avoid intake of water or snow particles.
6. Make sure that motorized damper blades are not blocked with snow or dirt. Inspect the dampers regularly to ensure a suitable airflow.

Heater Position

1. The axis of the duct must always be perpendicular to the face of the heater.
2. All heaters are made non-sensitive to air flow direction without impairing safety. The same heater could be installed in a horizontal or vertical duct.

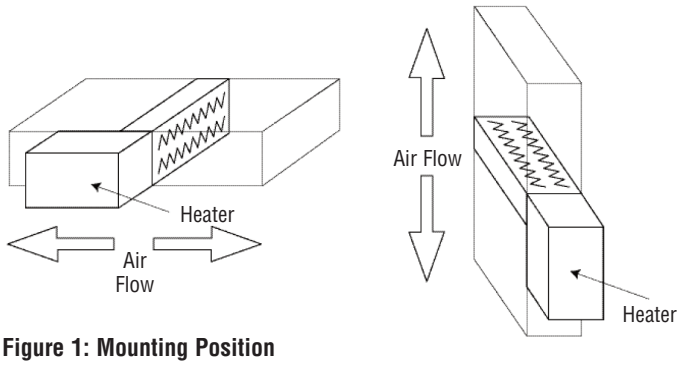


Figure 1: Mounting Position

<u>Model SC or ST (Slip-in type, See Figure 2)</u>

3. Cut an opening in the side of the duct.
4. Slip the heater into the duct until the hole is completely covered by flanges around the heater.
5. Fasten the heater to the duct with sheet metal screws and seal openings with a suitable sealing compound.
6. If the heater is heavy, use additional hangers to support the heater.

<u>Model FC or FT (Flanged Type, See Figure 3)</u>

7. Flange both ends of the duct outwards on three sides to match the heater's flanges.

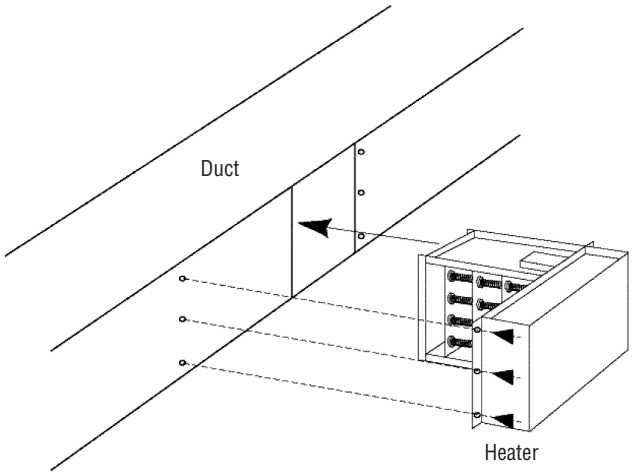


Figure 2: Installation of Slip-in Type SC or ST

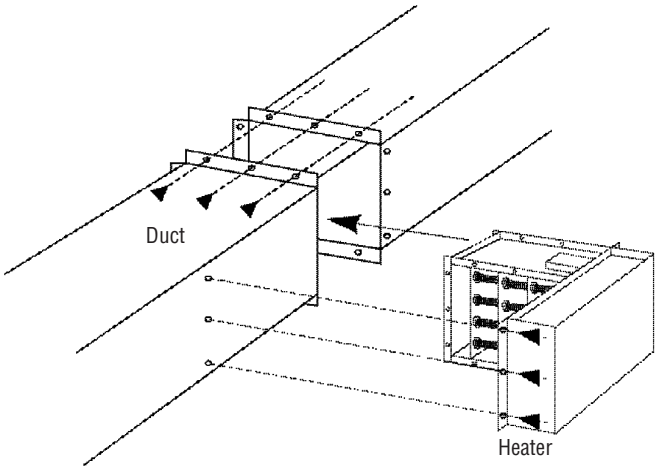


Figure 3: Installation of Flanged Type FC or FT

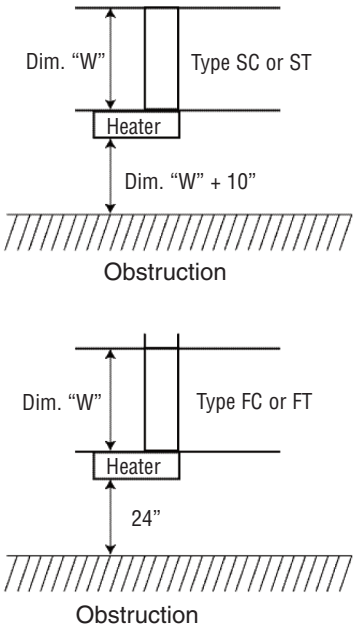


Figure 4: Minimum Distance for Safety and Service

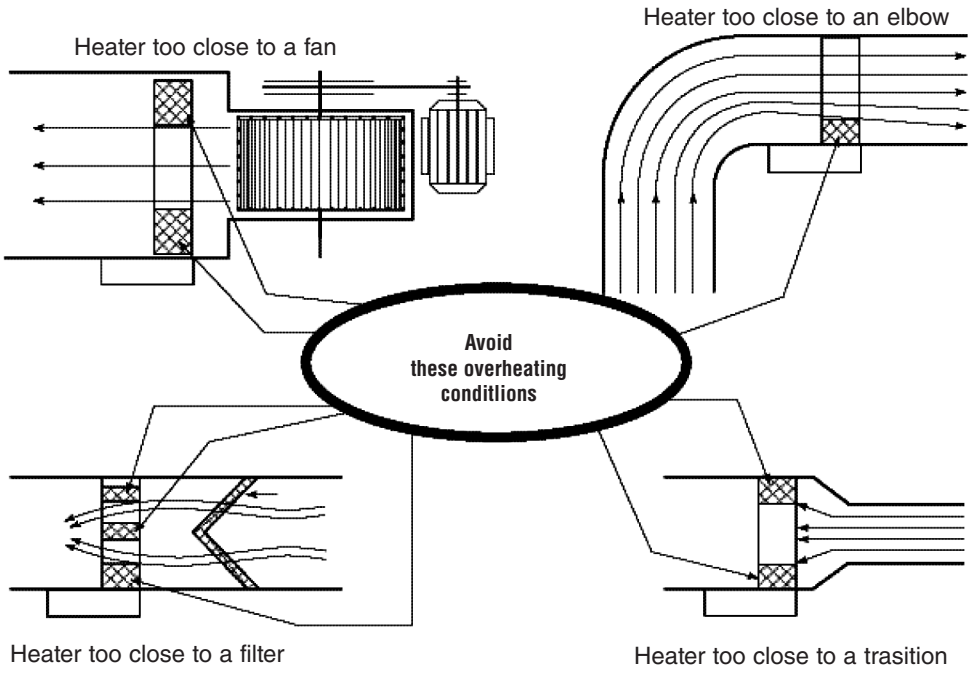


Figure 5: Overheating Conditions -
Heater shouldn't be installed closer than 4' downstream or 2' upstream from a fan outlet or any obstruction in the duct work.

8. Fasten the heater to the duct with sheet metal screws. (For heavy heaters, use nuts and bolts and additional hangers to support the heater).
9. Seal openings with a suitable sealing compound.
10. Spacing Requirements to obtain Optimal Operating Conditions (Please see drawings page 4).
    - 24 inches between the heater and filter frames.
    ** inches between the heater and elbows in the duct.
    ** inches between the heater and branches in the duct.
    ** inches between the heater and sharp transitions of the duct.
    ** = minimum distance = the largest of two dimensions (W or H) up to 48".

Examples: heater of 12" x 12" minimum distance 12".
heater of 30" x 12" minimum distance 30".
Heater of 60" x 30" minimum distance 48".

- 48 inches between the heater and a double outlet fan, (except with split duct design)
- 24 inches between the heater and access doors or diffusers, (except if a metal screen is supplied with the heater.
- 1 inch between the duct at the outlet side and combustible materials for a length of 72 inches, (for vertical ducts only).
- For the flanged type, 24 inches between the control box cover and obstructions to allow space for installation and service.
- For the slip-in type, width of the duct (dimension W) + depth of the control box + ten (10) inches between the control box cover and obstructions to allow slipping the heater out the duct and to allow safe servicing.

Electrical Installation of Heaters

1. Disconnect all power sources before opening the control box and working within.
2. Read the nameplate carefully and consult wiring diagram included with the unit before starting to wire.
3. Use only wires suitable for 75°C. Wires shall be sized according to the National Electrical Code requirements. All wires must be brought in through knock-outs.
4. Install a disconnect switch close to the heater according to the code unless a disconnect switch is already built into the heater.
5. Use class 2 wiring for control circuit connections to the duct heater.
6. If magnetic contactors are mounted outside of the duct heater, use only contactors approved for the following:
    - 250,000 operations when controlled by auto-reset thermal cut-out (A) and by other switching devices in series with this cut-out (thermostat, step controller, air flow switch, etc.).
    - 100,000 operations when controlled by auto-reset thermal cut-out (A) alone.
    - 100,000 operations when controlled by auto-reset thermal cut-out (A) plus manual reset cut-out in series.(A&M).
    - 6,000 operations when controlled by manual reset cut-out (M) alone.
7. Rating of external control devices shall be suitable for handling the VA ratings as marked on the nameplate, otherwise, a back-up relay must be used.
8. Heaters are generally supplied with one extra terminal marked (I) for fan interlock or air sensing device connection. Remove jumper between terminals I and C before connecting the fan interlock, Select a suitable air flow sensing device of the differential pressure sensing type, with snap acting contacts. A slow make, slow brake device may cause undue cycling and in some instances chattering of the contactors. When fresh air dampers are used, make sure the heater is properly interlocked to prevent it from being energized before the damper is fully open.

OPERATING INSTRUCTIONS

1. Ensure that sufficient air flow as marked on the nameplate is passing through the heater. Air flow should be evenly distributed across the entire face of the heater. Use air turning vane at duct elbows and splitter damper at duct branch-offs to streamline the air flow in the heater. Use suitable air flow sensing device or interlock the heater with fan. An insufficient air flow will lead to the opening of the auto-reset thermal cut-out or damage to the heating elements.

⚠ WARNING ⚠

THE AIR FLOWING THROUGH THE DUCT WHERE THE HEATER IS INSTALLED SHALL NOT CONTAIN ANY COMBUSTIBLE PARTICLES, NOR ANY FLAMMABLE VAPOR OR GAS.

2.. The air temperature should not exceed 27°C (81°F) at the heater inlet and 66°C (151°F) at the outlet.

3. The heater is protected by a differential pressure switch. To keep the contact of this switch closed, it is necessary to maintain a minimum total pressure of 0.07 inches of water for a constant flow. Unless otherwise specified, all duct heaters operate horizontally or vertically with the airflow in either direction. This unique feature allows the contractor maximum flexibility in installation and avoidance of problems.

4. Manual-reset thermal cut-out is a protection device that is standard on all heaters. Please check the auto-reset thermal cut-out BEFORE re-setting the manual thermal cut-out. If any defect has been detected in the auto-reset thermal cut-out, it will be necessary to replace it before re-setting the manual-reset thermal cut-out.

MAINTENANCE INSTRUCTIONS

It is important to keep this heater clean. Your heater will give you years of service and comfort with only minimum care. To assure efficient operation follow the instructions below.

⚠ WARNING ⚠

ALL SERVICING BEYOND SIMPLE CLEANING THAT REQUIRES DISASSEMBLY SHOULD BE PERFORMED BY QUALIFIED SERVICE PERSONNEL.

⚠ WARNING ⚠

TO REDUCE RISK OF FIRE AND ELECTRIC SHOCK OR INJURY, DISCONNECT ALL POWER COMING TO HEATER AT MAIN SERVICE PANEL AND CHECK THAT THE ELEMENT IS COOL BEFORE SERVICING OR PERFORMING MAINTENANCE.

Heaters have been designed to operate long term without problems. Those responsible for equipment and maintenance should be aware of the following suggestions.

1. A periodic visual inspection. This precautionary step will help to keep your installations operating well. Note these eventual first signs of problems: Accumulation of dust on the heating elements, signs of overheating on the heater frame, traces of water or rust on the control box.

2. Two weeks after startup , all electric connections to contactors should be checked and tightened up. Before each heating season, check the resistance between the heating elements and ground. It is also recommended to check the electrical connections to heating elements, magnetic contactors, and main power lugs. This inspection is recommended monthly during the first four months of operation. After that, two inspections per heating season are sufficient.

3. Inspect the following checkpoints:
   - Check all fuses;
   - Check the resistance to ground for each circuit;
   - Check the resistance phase to phase for each circuit;
   - Check the tightening of connections at all contactors and heating elements;
   - Check all contactors.

4. For off-season maintenance where tubular heating elements are used, it is strongly recommended that you start the heating system from time to time. This precaution will prevent moisture from percolating through the terminal gaskets into the heating element and accumulating in the insulating powder. Should a heater be shut off for a long period, we recommend that you check carefully the resistance to ground for each circuit. It is important not to power a heater when too low resistance to ground has been measured. It is also recommended to pay attention to any other heater operating in normal conditions. Control components such as step controllers or modulating valves (SCR) should be maintained and checked according to respective manufacturers instructions. Any defective components should be replaced only with identical original parts.

Maintenance Cleaning Instructions:

(To be performed only by Qualified Service Personnel)

At least annually, the heater should be cleaned and serviced by a qualified service person to assure safe and efficient operation. This should include, as necessary, disassembling the heater from the duct to clean residue from the unit. After completing the cleaning and servicing, the heater should be fully reassembled and checked for proper operation.

LIMITED WARRANTY

All products manufactured by Marley Engineered Products are warranted against defects in workmanship and materials for two years from date of shipment, including the heating elements which are warranted against defects in workmanship and materials for two years from date order shipped. This warranty does not apply to damage from accident, misuse, or alteration; nor where the connected voltage is more than 5% above the nameplate voltage; nor to equipment improperly installed or wired or maintained in violation of the product's installation instructions. All claims for warranty work must be accompanied by proof of the date of installation.

The customer shall be responsible for all costs incurred in the removal or reinstallation of products, including labor costs, and shipping costs incurred to return products to Marley Engineered Products Service Center. Within the limitations of this warranty, inoperative units should be returned to the nearest Marley authorized service center or the Marley Engineered Products Service Center, and we will repair or replace, at our option, at no charge to you with return freight paid by Marley. It is agreed that such repair or replacement is the exclusive remedy available from Marley Engineered Products.

THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESAID EXPRESSED WARRANTIES ARE HEREBY DISCLAIMED AND EXCLUDED FROM THIS AGREEMENT. MARLEY ENGINEERED PRODUCTS SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES ARISING WITH RESPECT TO THE PRODUCT, WHETHER BASED UPON NEGLIGENCE, TORT, STRICT LIABILITY, OR CONTRACT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

For the address of your nearest authorized service center, contact Marley Engineered Products in Bennettsville, SC, at 1-800-642-4328. Merchandise returned to the factory must be accompanied by a return authorization and service identification tag, both available from Marley Engineered Products. When requesting return authorization, include all catalog numbers shown on the products.

HOW TO OBTAIN WARRANTY SERVICE AND WARRANTY PARTS PLUS GENERAL INFORMATION

1. Warranty Service or Parts **1-800-642-4328**
2. Purchase Replacement Parts **1-800-654-3545**
3. General Product Information **www.marleymep.com**

Note: When obtaining service always have the following:

1. Model number of the product
2. Date of manufacture
3. Part number or description

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