



# THERMOLEC

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## Electric Heating and Controls

### Installation, Operating and Maintenance Instructions for THERMOLEC electric heaters - type FC & SC - (or tubular FT & ST).

#### 1- Mechanical Installation of THERMOLEC heaters.

- 1.1 Handling.** 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.

**1.2 Installation.**

#### Heater Position

- 1.2.1** The axis of the duct must always be perpendicular to the face of the heater.  
**1.2.2** The heating elements must always be installed horizontally.

#### **Model SC or ST (Slip-in type)** (Please see drawings page 4).

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

#### **Model FC or FT (Flanged type)** (Please see drawings page 4).

- 1.2.7** Flange both ends of the duct outwards on three sides to match the heater's flanges.  
**1.2.8** Fasten the heater to the duct with sheet metal screws. (For heavy heaters, use nuts and bolts and additional hangers to support the heater).  
**1.2.9** Seal openings with a suitable sealing compound.

#### **1.2.10 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", (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.

## 12.12 Important Notes

- Do not install a duct heater in a vertical duct directly above a ceiling diffuser or an opening in the ceiling.
- Do not install standard heaters outdoors. Order a heater with weatherproof control box instead.
- Do not install spray humidifiers upstream of duct. Install it downstream instead.
- Do not cover the control box with thermal insulating materials.
- Use special air intake louvers of weatherproof construction for preheat duct heaters to avoid intake of water or snow particles.

Make sure that motorized damper blades are not blocked with snow or dirt. Inspect the dampers regularly to ensure a suitable airflow.

## 2- Electrical Installation of THERMOLEC heaters.

**2.1 Disconnect all power sources** before opening the control box and working within.

**2.2 Read the nameplate carefully** and consult wiring diagram before starting to wire.

**2.3 Supply wires:**

Use only wires suitable for 75°C. Wires shall be sized according to the Canadian Electrical Code requirements. All wires must be brought in through knock-outs.

**2.4 Disconnecting means:**

Install a disconnect switch close to the heater according to the code unless a disconnect switch is already built into the heater.

**2.5 Control circuit wiring:** Use class 2 wiring for control circuit connections to the duct heater.

**2.6 Magnetic contactors:**

If magnetic contactors are mounted outside of the duct heater, use only contactors approved for:

- 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.

**2.7 External Controls ratings:**

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.

**2.8 Air Flow Interlock:**

Heaters are generally supplied with one extra terminal marked (1) 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 break 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.

## 3- Operating THERMOLEC Heaters.

**3.1 Minimum air flow.**

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.

**3.2 Warning.**

The air flowing through the duct where the heater is installed shall not contain any combustible particles, nor any flammable vapor or gas.

**3.3 Air Temperature.**

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

### **3.4 Minimum static pressure and air direction.**

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 **Thermolec** 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. (Please see drawings page 4)

### **3.5 Manual-reset thermal cut-out**

This protection device is standard on all heaters of less than 300V and 30 KW and is optional on all other heaters. Please check the auto-reset thermal cut-out BEFORE re-setting the manual thermal cut-out. If any defest 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.

## **4- Maintenance.**

All **THERMOLEC** heaters have been designed to operate long term without problems. Those responsible for equipment and maintenance should be aware of the following suggestions.,

### **4.1 Visual Inspection.**

**THERMOLEC** strongly recommends a periodic 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

### **4.2 Electrical Inspection.**

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

### **4.3 What are the 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.

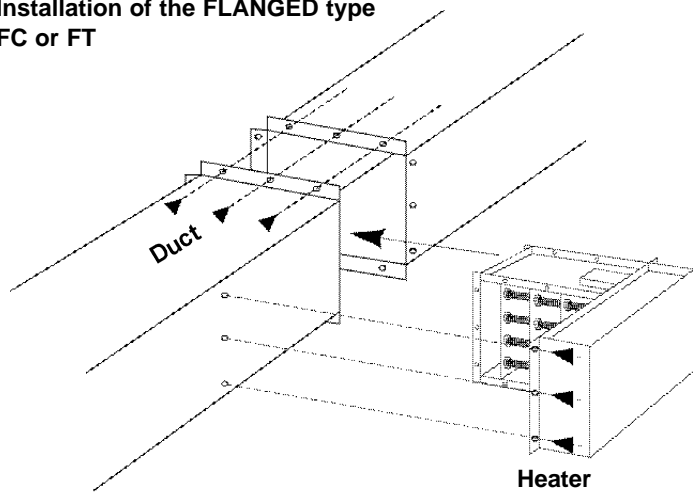
### **4.4 Off-season maintenance**

Where tubular heating elements are used, **THERMOLEC** strongly recommends 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.

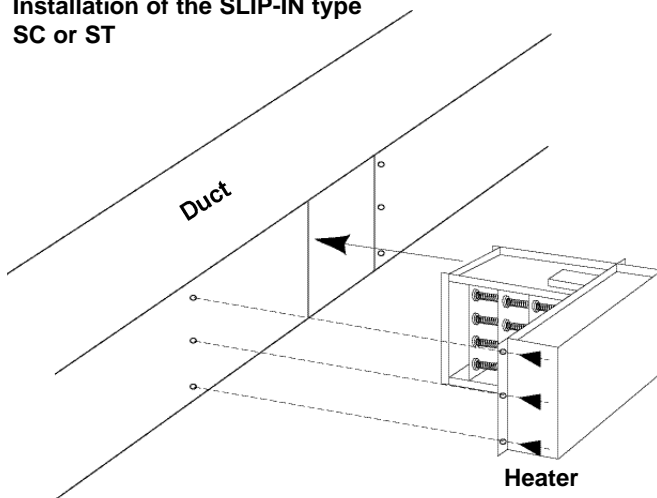
Should a heater be shut off for a long period, we recommend that you check carefully the resistance to ground for each circuit. It is important not to power a heater when too a low resistance to ground has been measured. It is also recommended to pay attention to any other heater operating in normal 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 origin parts.

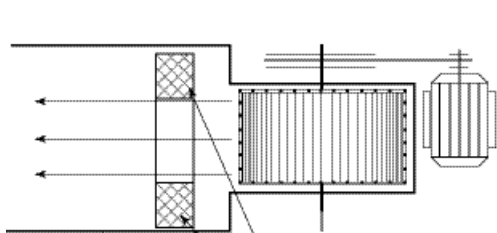
**Installation of the FLANGED type  
FC or FT**



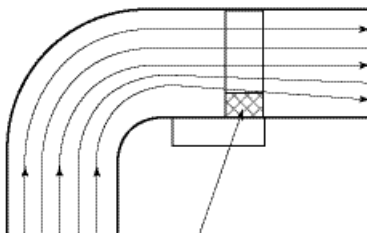
**Installation of the SLIP-IN type  
SC or ST**



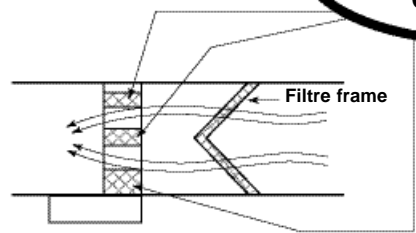
**Heater too close to a fan**



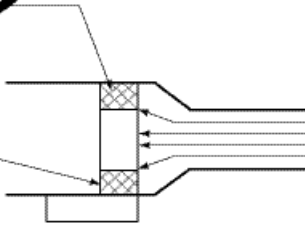
**Heater too close to an elbow**



**Avoid these overheating conditions**

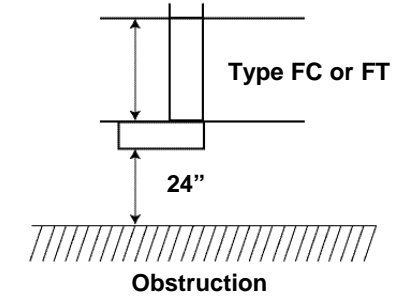
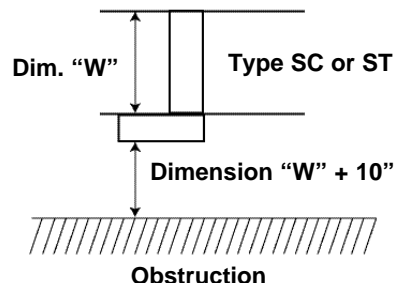


**Heater too close to a filter**

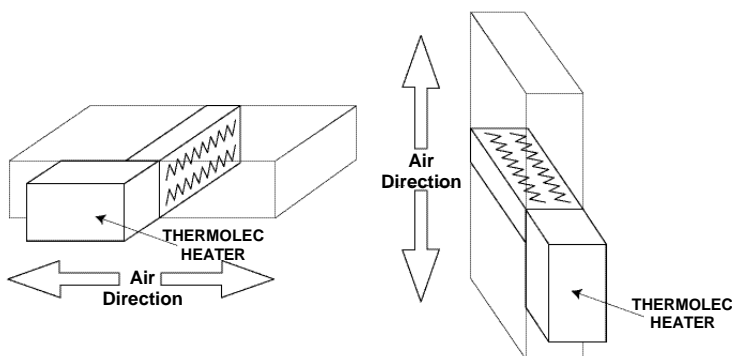


**Heater too close to a transition**

**Minimum recommended distance  
for safety and service**



**Universal mounting of Thermolec heaters**



**Warranty**

- 1 - THERMOLEC LTD guarantees its heater resistance elements against any defect in workmanship and material for a period of two years and other built-in components for a period of one year, starting from the date of shipment from its factory.
- 2 - THERMOLEC LTD will repair or replace without charge, in its factory or in the field at its own discretion, the heater or part, which upon manufacturer examination, is considered to be defective.
- 3 - Misuse of this product, or repairs made by others without THERMOLEC LTD's authorization, will void this warranty.
- 4 - THERMOLEC LTD shall not be held responsible for damage or delay and shall not be held liable for any charges resulting from the removal or replacement of the allegedly defective heater.
- 5 - THERMOLEC LTD shall not be held responsible for any incidental or consequential damage or delay due to workmanship or material. No additional charge will be accepted for repair, replacement or modification if prior written authorization was not obtained from THERMOLEC LTD.
- 6 - Any control device or accessory, supplied with the heater, to be mounted or connected remotely, will only be guaranteed by the manufacturer per conditions stated in paragraph 5.