

ELECTRICAL HEAT

An electric heating system is used in areas where electricity is cheaper than oil or gas. At times it is used as **hybrid heating system** to supplement a wood, gas or oil burning system. For the most part electric resistance heating is used as area heaters such as baseboard or panel heating. When used with central furnace or boiler systems, the electrical resistance coils are immersed directly into the airstream (forced warm-air) or into water (boiler). As the current passes through the coils, they get hot and transmit their heat directly to the air or water.

There is no need for a chimney with this system, thus the electrical energy to heat is 100% efficient since no heat is lost up through a chimney. Although cheaper to install than a gas or oil burner, the operating costs are substantially more depending on the area. To achieve high efficiency and to minimize costs, an electrically heated home should be well insulated.

An **electric furnace** has 240-volt circuits for heating and 24-volt circuits for control switches and relays. Since it is clean and simple, it is less likely to have problems as compared to combustion furnaces. The coils are located in the furnace between the blower fan and the warm-air plenum. When the thermostat calls for heat, the low-voltage control block closes one or more relay to energize 240-volt resistance heating elements. The blower is activated at the same time to circulate air over the elements and through the ducts to various rooms.

With repeated on/off cycles and continuous vibration from the blower fan, connections can become loose causing sparks that can burn connectors and blow fuses. With the main power off, have a service technician inspect and maintain an electric furnace annually:

- **CHECK AND TIGHTEN TERMINAL SCREWS**
- **CHECK CLIP CONNECTORS AND REPLACE ANY THAT ARE LOOSE, PITTED OR SCORCHED**
- **REPLACE DEFECTIVE HEATING ELEMENTS**

An **ELECTRIC BOILER** is similar to forced warm-air, except that the elements are immersed in the water contained in the boiler. As the water heats up, it is circulated through the distribution piping to convectors or radiators.

BASEBOARD HEATERS require no pipes or ductwork. They are connected to the electrical system in the house and have their own thermostat and cutoff switch. For the most part, baseboard heaters are very reliable. Some use resistance coils that glow red hot (similar to a stove element); others have a resistance wire that heats a ceramic tube; and others have the element sealed in a tube - surrounded by fins to radiate the heat into the rooms.

WALL AND CEILING HEATERS are typically used in small areas and bathrooms.

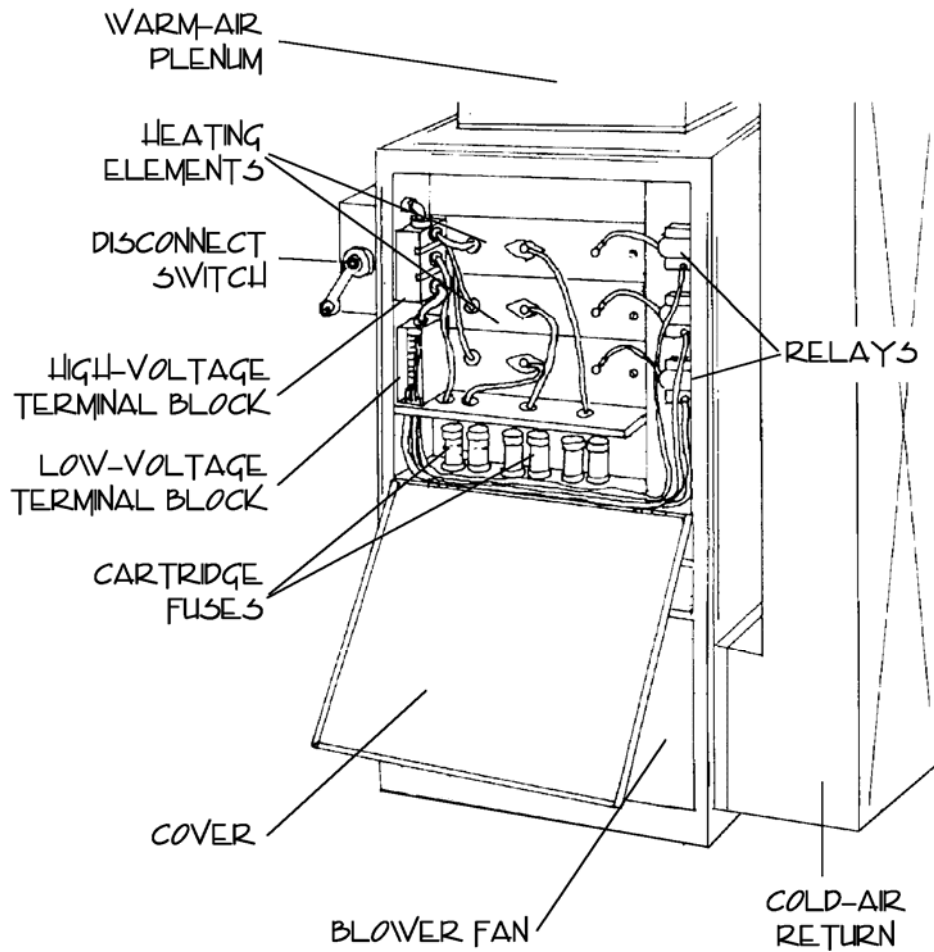
RADIANT HEATING PANELS may either be electrically heated glass panels or special gypsum board panels (electric resistance wires are embedded in the gypsum board). Both are wired into the electrical system and controlled by a thermostat. In some jurisdictions, some heating panels are no longer permitted. The problems listed with these heating panels are the result of poor installation, poor building materials, and poor manufacturing process. Some of the flexible radiant ceiling panels not approved by the CSA (Canadian Standards Association). *Have a licensed electrician evaluate the condition of the following radiant ceiling panels:*

Flexwatt Heating Panels; Thermaflex Heating Panels; ESWA and Flexel International Heating Panels

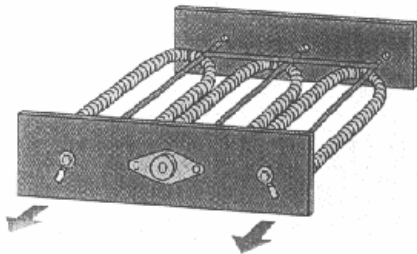
DUCT HEATERS are designed for installation in the ducts of existing forced warm-air heating systems. The supplemental heaters can be controlled by a separate thermostat located in the area requiring heat. The must be controlled so the turn on only when the blower fan is running.

For further information contact your local public utilities office, a licensed HVAC contractor, electrician or the American Society of Heating, Refrigerating and Air-conditioning Engineers (ASHRAE) or the Heating, Refrigerating and Air conditioning Institute of Canada (HRAI).

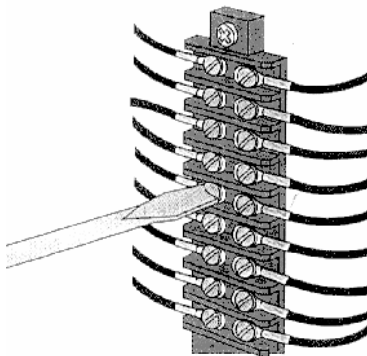
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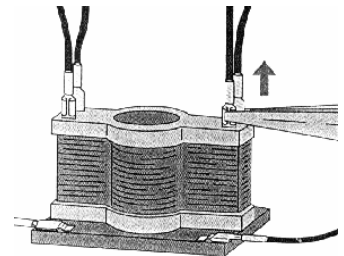
TYPICAL FORCED WARM-AIR ELECTRIC FURNACE



RESISTANCE COIL HEATING ELEMENT



LOW-VOLTAGE TERMINAL BLOCK AND TERMINAL SCREWS



RELAY AND CLIP CONNECTORS