



Home Heating Systems

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Energy Saving Thermostats

New thermostats that have appeared on the market for saving energy offer a wide range of control and cost options to the homeowner. All types essentially perform automatically what previously was required manually, that is, setting back the thermostat temperature setting whenever heating is not needed. Typically, thermostat settings are reduced during sleeping hours and also during the day if the home remains unoccupied.

Energy savings according to a rough rule of thumb, amount to 1 percent of the total heating bill for each degree of setback for an 8 hour period. For homes with central cooling, similar savings are possible for thermostat "setups." Actual savings will then depend on one's present heating bill, and the specific setback program selected. Savings with automatic thermostats compared to manual setbacks can be significant if user adjustments are unreliable. The unique benefits of control freedom and waking or returning to a heated home may alone be worth the price.

Automatic thermostats may be grouped by type of control system—clock or programmable. Clock thermostats, appearing first, served the early market well but are now considered relatively limited compared to their programmable successors. A clock dial is physically arranged so that heating occurs only at preset hours. Although up to three setback periods may be available, the setback amount (in degrees temperature) is fixed.

Setback periods are often limited to multiples of 1 hour. Variations of the clock thermostat include one which will automatically setback until a button is touched reactivating the heating system for a pre-selected time period of 1/2 to 12 hours. Although less expensive than other clock thermostats, this unit is not truly automatic and will not heat the home without user input. The least expensive alternative is a thermostat heater mounted below an existing thermostat that during the setback mode warms and "tells" the thermostat not to deliver heat. Costs are generally in the range of \$40-\$80.

Modern programmable thermostats utilize micro-processor circuitry for increased information storage and control functions. Up to six different timed temperature settings are commonly available with one minute clock settings and one degree setback accuracy. In addition, weekdays and weekends may be programmed separately and, in some cases, even individual days. Thus, fine tuning of one's heating needs is possible for increased energy savings and convenience.

Many programmables provide an override function, allowing temporary raising or lowering of the thermostat setting without changing the program. Most also allow locking in the setback temperature when away from home for an extended time. Some thermostats come "pre-programmed" whereby setback periods are preset requiring only temperature settings to be entered. Where such pre-programming cannot be altered by typical multi-step custom programming, a choice among various pre-programs is typically offered.

Another feature worth considering is the ability to program the thermostat before wall connection to ease the learning process. Costs vary widely depending on the number of control features included, but most fall in the range of \$60-\$120.

On more advanced programmable thermostats, additional control options are available. Heating system running time can be monitored on a daily and weekly basis to compare the effectiveness of various programs.

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Anticipators will turn on the heat a set number of minutes before needed and turn off the heat a set number of degrees before temperature is reached to prevent overheating. Compensating thermostats will monitor heating times as a function of house temperature and adjust the turn on (anticipation) time accordingly. Temperature feedback is important for thermostats controlling heat pumps since it is advantageous to bring the house to temperature slowly without requiring the use of expensive backup resistant heating.

Thermostats that control more than one heating system are referred to as multi-stage or dual-fuel systems. In the air conditioning mode, certain thermostats are able to minimize short on and off cycling, and control fans for highest efficiency. The above options can raise thermostat costs considerably, as high as \$300.

Thermostat installation by the homeowner is often recommended by the manufacturer, but is also commonly available for a fee of \$25-\$75. The critical concern is compatibility of the thermostat with the heating and cooling systems. Most thermostats are designed for only a 24 volt AC furnace control circuit. Many will not work with heat pumps, millivolt systems (certain gas heaters), and 120 volt AC systems. It is necessary to check for compatibility prior to purchase by examining the thermostat's instruction manual and wiring diagrams as well as one's existing thermostat wiring. In case of power failure, battery backup is common.

Several thermostats operate on battery power alone. Other than compatibility, the most important consideration may be finding a thermostat with options that best satisfy one's individual needs. Proper selection and installation can significantly influence the benefits of these units.

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