

Project

15

Programmable Thermostat

Project Rating:

Economy



Environmental Benefit



Level of Difficulty



Some people keep the thermostat in their homes set at a constant level, day in and day out, thinking that maintaining a consistent temperature saves energy. The reality is that most homes take only 15-30 minutes to heat up or cool down, so running the air conditioning or heating system at the same temperature 24 hours a day can waste a lot of energy—and costs a lot of money. It's a little like keeping a kettle running on the stove 24-hours a day in case you might like a hot drink sometime during the day! Homeowners can ofcoursecontrol heat and cooling by manually changing the thermostat as they come and go—or before they head off to sleep. But even, the most conscientious homeowner can forget at times.

To simplify your life and save energy, consider installing a programmable thermostat. These devices monitor and control heating and cooling systems automatically, based on your schedule (Figure 15-1). For example, they can be programmed to turn down the heat at night a half hour before you and your family head off to bed, say to 55°F to 60°F, and then turn it back up to 68°F to 70°F a half hour before you awaken. You can also program your thermostat to turn the heat down again as you and your family head off to work and school, then turn it up again a half hour before you arrive home. Programmable thermostats can also be used to control air conditioning. You can even program in a separate weekend setting. Programmable thermostats typically come with a manual override, so you can set the temperature differently on days when your routine changes.

Home improvement centers and hardware stores carry a variety of programmable thermostats ranging in price from about \$50 to over \$250. Features vary, so shop carefully, and for best performance, select an Energy Star-rated thermostat.

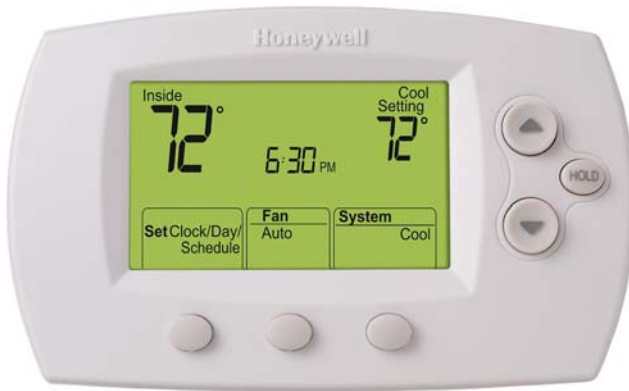
Programmable thermostats are easy to install and can reduce your energy bills by 10% or more per year, if properly programmed. They're also good for the environment—less energy use means less environmental pollution from power plants, especially greenhouse gas emissions.

Convenience is a great feature of these thermostats since you'll no longer need to adjust the temperature when going to bed or leaving the house. And lastly, your heating and air conditioning equipment won't run as often, meaning less noise and reduced wear and tear—which results in lower maintenance, repair, and replacement costs.



Go Green!

Turn off unneeded lights and use natural light as much as possible. Not only will you save energy to power light bulbs, but you'll keep your home cooler in the summer, especially if your using incandescent bulbs.



Programmable Thermostat Options



Installation

Installing a programmable thermostat normally takes about 20 to 30 minutes. All you'll need are some basic tools, including a screwdriver, wire cutter/stripper, drill with 3/16" drill bit, and a level. Be sure to follow the manufacturer's printed instructions.

First, shut off the power to both the circuit to which the thermostat is to be connected and circuits for the furnace or boiler and the air conditioner. Warn household members, and, to be on the safe side, tape off the fuse or circuit breaker. Adjust the thermostat setting way up or way down to see if the heat or AC kicks in, depending on which setting it's turned to. If it switches on, you have not shut off the correct circuit breaker.

With the power switch shut off, remove the cover (typically attached to a mounting plate attached to the wall) from the old thermostat. Examine the mounting plate. If wires are screwed into terminals in the front of the plate, disconnect them. The wires should be color-coded—for example red and white. If not, the terminals should be labeled.

Disconnect the wires, one at a time. If not color-coded, label them (with the same markings on the terminal) using masking tape. Now remove the back plate, making sure the wires don't slide into the wall. (To prevent this, roll the wires around a pencil.)

If there are no wires attached to terminals on the face of the back plate, the connections are on the back. To access them, remove the screws that attach the wall plate to the wall. If color-coded, you're in good shape. If not, label the wires so they correspond with the terminal to which they're attached *before* you unscrew them.

After removing the wall plate, lay out holes for the new thermostat using the template provided by the

Installation Tip

The number of wires attached to a thermostat varies. If the thermostat only controls a heating system, you'll find two wires. If it controls a furnace and a central air conditioner, there will be more wires. Don't fret, though, they should be color-coded, or the screws to which they're attached should be labeled.

manufacturer. If there's no template, use the back plate of the new thermostat and mark the location of the new screw holes with a pencil.

Now drill holes according to the manufacturer's specifications and insert plastic anchors provided with the thermostat. They're required to hold the screws in plaster and drywall. You won't need them if you can drill into a wall stud, which is unlikely. Insert the plastic anchors carefully. Now attach the back plate of the programmable thermostat to the wall by driving the screws either into the plastic anchors or into studs. Attach the wires to the terminals.

Install batteries in the new programmable thermostat for backup power to protect the program in case of a power failure, then attach the cover and turn the power back on. Program it according to the manufacturer's directions.

What to Watch Out For

Before you head out to buy a new thermostat, be sure to check the number and type of wires that are attached to the old one so you know what type to purchase (that is, a high-voltage or low-voltage thermostat). You'll have to remove the face plate from the wall in order to do this. (Once again, be sure to turn the power off first.)

If the wires are thin and come directly out of the wall, they're usually carrying low-voltage current. Low-voltage thermostats are typically used for forced-air, baseboard hot water, and radiant floor heating systems. With proper precautions, this should be a relatively safe job for a do-it-yourselfer.

If your home is heated by an electric baseboard heater, however, the situation may be different. The thermostat is operating off of a 120-volt electricity, which can cause a significant shock. Don't try to replace the thermostat yourself unless you've had significant experience with electrical wiring. Hire a professional for these situations.

Shopping Tips

Here are some features to look for in a programmable thermostat:

- Storage capacity—the ability to store multiple settings; most programmable thermostats offer six settings, including weekday and weekend programs.
- Manual override—allows you to override settings temporarily without affecting the daily or weekly program.
- Battery backup—to save the program in case of a power outage.
- Easy-to-read and logical digital display.
- Temperature accuracy—within one degree, plus or minus.
- Good instructions—make sure these are easy to follow and printed on the inside cover of the unit, so you don't need to consult the owner's manual for programming.

When replacing an old thermostat, you'll very likely find that it has a sealed tube containing mercury, a hazardous substance. Don't throw the old thermostat in the garbage. Contact your town's waste management agency to obtain instructions for proper disposal.



Go Green!

- Whenever possible, use rechargeable batteries. They have economic and environmental benefits compared to disposable batteries. They cost more and can have more toxic ingredients than disposable batteries, but can be recharged many times, resulting in less toxic landfill waste overall. Manufacturers of some NiMH rechargeable batteries claim these can be recharged up to 3,000 times.
- Some used thermostats can be donated to used building materials outlet stores.

What Will It Cost?

As mentioned earlier, programmable thermostats cost anywhere from \$50 to \$250, depending on the features. Thermostats designed to work with heat pumps are more costly because of the requirement for two-stage heating.

Cost Estimate: Professional installation of a new programmable thermostat.

Materials: \$120

Contractor's total, including materials, labor, and markup: \$210

Costs are national averages and do not include local sales tax. If you have one contractor do several small projects, you'll save money overall.

What Will You Save?

A programmable thermostat can pay for itself fairly quickly in energy savings. Your investment could easily be repaid within a year with resulting energy savings. In the winter, every degree a thermostat is set back over an eight-hour period will cut your heating bill by about 1%. If you turn down the heat 5 degrees at night, for example, you can cut your bill by 5%. Turning down the heat 10 degrees during the day while you're at work will cut the bill an additional 5%.