Honeywell

T8400C1099, T8401C1031 Electronic Thermostats

The T8400 and T8401 Thermostats provide single-stage, non-programmable temperature control for 24V heating-cooling systems with manual changeover from heat to cool. Heating cycle rate is selectable at 1, 3, 4, 5, 6, 9, or 12 cph. Cooling cycle rate is fixed at 3 cph. Temperature indication can be set for °F or °C.

The T8400 Thermostat is powered through the heating/cooling system controls. The T8401 requires a common wire for operation. Batteries are not required because setpoints are held permanently by non-volatile memory.

The T8400 and T8401 models include a thermostat, wallplate (for wiring and mounting thermostat) and owner's guide.

⚠ MERCURY NOTICE

If this control is replacing a control that contains mercury in a sealed tube, do not place your old control in the trash.

Contact your local waste management authority for instructions regarding recycling and the proper disposal of an old control containing mercury in a sealed tube.

INSTALLATION

When Installing this Product…

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

⚠ CAUTION

Electrical Shock or Equipment Damage Hazard.
Can shock individuals or short equipment circuitry.
Disconnect power supply before installation.

Location

Install the thermostat about 5 ft (1.5m) above the floor in an area with good air circulation at average temperature. See Fig. 1. Do not install the thermostat where it can be affected by:
— drafts or dead spots behind doors and in corners.
— hot or cold air from ducts.
— radiant heat from the sun or appliances.
— concealed pipes and chimneys.
— unheated (uncooled) areas such as an outside wall behind the thermostat.

This thermostat is a precision instrument and was carefully adjusted at the factory. Handle it carefully.

Mounting Wallplate to Wall

IMPORTANT
Level only for appearance. The thermostat functions normally even when not level.

Mount the T8400 and T8401 with the screws provided (see Fig. 2) as follows:
1. Place the wallplate at the desired location on the wall.
2. Pull the thermostat wire through the entrance hole on the wallplate.
3. Fasten the wallplate to the wall using the anchors and screws provided.
4. After wiring the wallplate, plug the hole to prevent drafts from affecting the thermostat; see Wiring section.
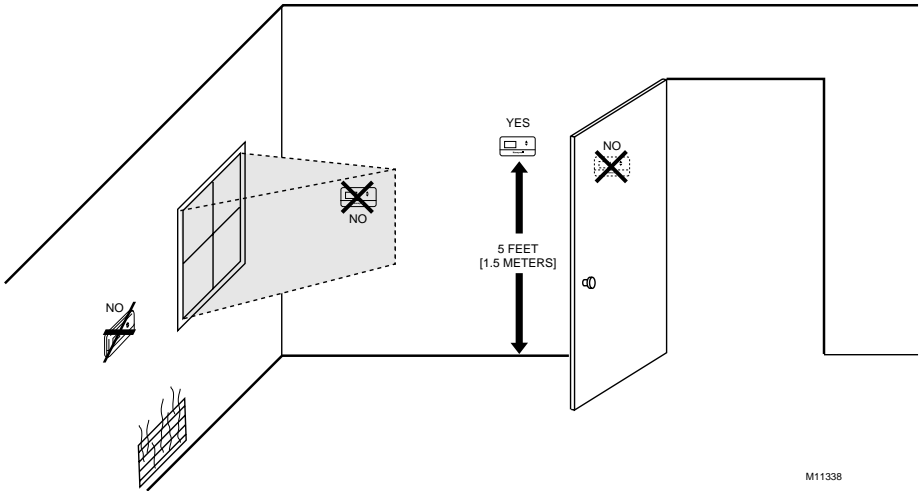
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Fig. 1. Typical location of thermostat.

⚠1 WHEN USING WALL ANCHORS, DRILL 3/16 INCH HOLES FOR DRYWALL, 7/32 INCH HOLES FOR PLASTER OR WOOD.

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Fig. 2. Mounting wallplate to wall.

Setting Fan Operation (Fuel) Switch

The fan operation (fuel) switch is preset at the factory in the F position. See Fig. 3. This is the correct setting for most systems. If this system is an electric heat system, set the switch to the E position. The E setting allows the fan to turn on immediately with the heating or cooling equipment in a system where the G terminal is connected.

Wiring

IMPORTANT
> *Use an 18-gauge maximum wire to wire the T8400 and T8401 Thermostats.*

All wiring must comply with local electrical codes and ordinances. Disconnect the power supply to prevent electrical shock or equipment damage.

NOTE: To ensure proper mounting of thermostat, restrict all wiring to the shaded area. See Fig. 4.

The shape of the terminals permits insertion of straight or wraparound wiring connections; either method is acceptable. See Fig. 5.
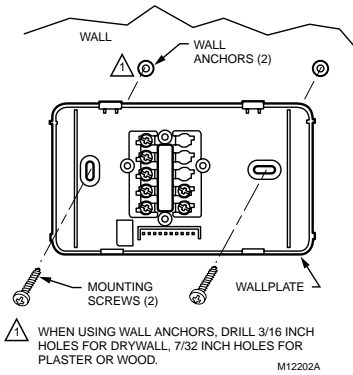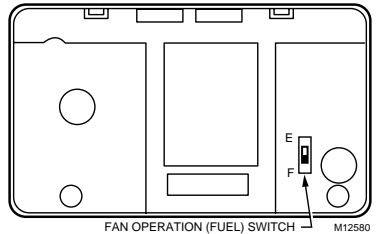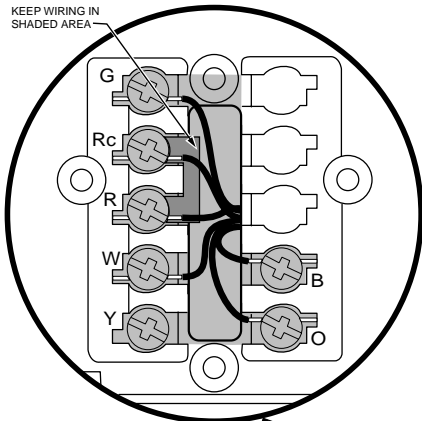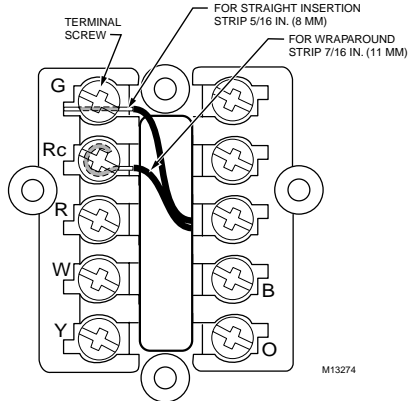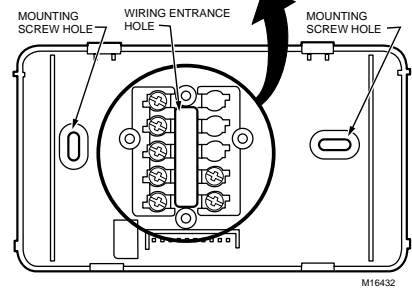
Refer to Fig. 6 through 10 for typical wiring hookups.

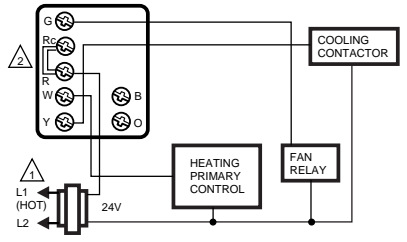FAN OPERATION (FUEL) SWITCH   M12580

Fig. 3. Fan operation (fuel) switch.

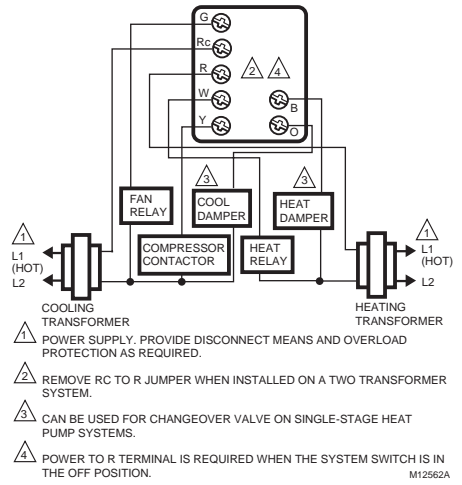**Fig. 4. Restrict wiring to shaded area (T8400C1099 shown).**

**Fig. 5. Wiring connections (T8400C1099 shown).**

1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

2 FACTORY INSTALLED JUMPER.

Fig. 6. Typical hookup of T8400C1099 in heat-cool system with single transformer.

1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

2 REMOVE RC TO R JUMPER WHEN INSTALLED ON A TWO TRANSFORMER SYSTEM.

3 CAN BE USED FOR CHANGEOVER VALVE ON SINGLE-STAGE HEAT PUMP SYSTEMS.

4 POWER TO R TERMINAL IS REQUIRED WHEN THE SYSTEM SWITCH IS IN THE OFF POSITION.

Fig. 7. Typical hookup of T8400C1099 in heat-cool system with two transformers.

1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

2 CAN BE USED FOR CHANGEOVER VALVE ON SINGLE-STAGE HEAT PUMP SYSTEMS.

3 FACTORY INSTALLED JUMPER.

4 FIELD INSTALLED JUMPER.
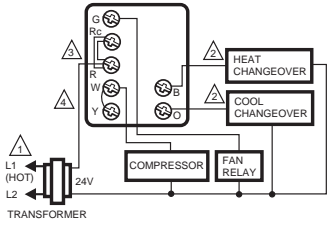
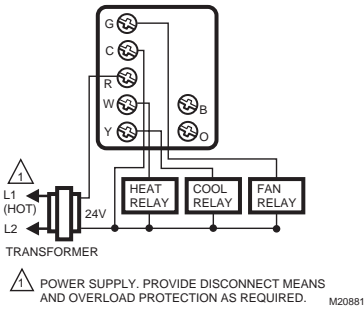**Fig. 8. Typical hookup of T8400C1099 in single-stage heat pump systems.**
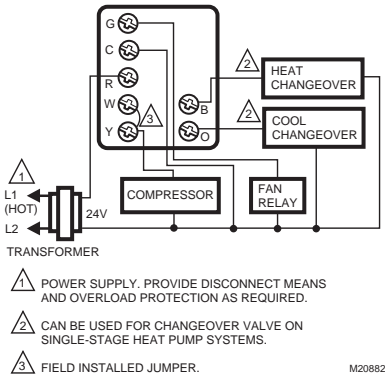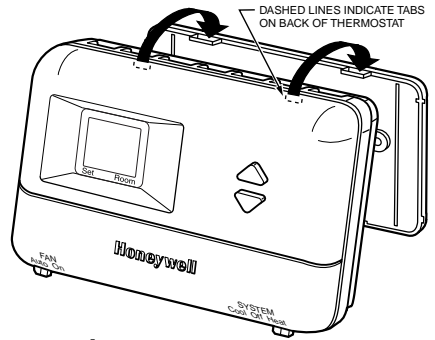
Fig. 9. Typical hookup of T8401C1031 in heat-cool system.

Fig. 10. Typical hookup of T8401C1031 in single-stage heat pump system.
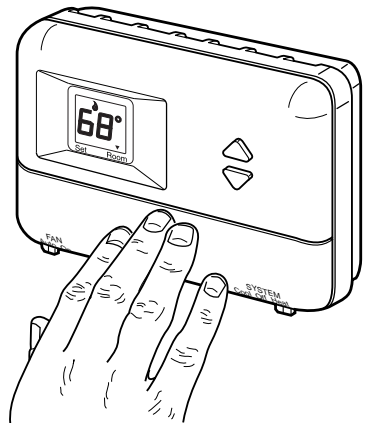
Mounting Thermostat to Wallplate

1. Engage the tabs at the top of the thermostat and wallplate.
2. Swing down the thermostat and press the lower edge of the thermostat onto the wallplate to latch. See Fig. 11.

A ENGAGE TABS AT TOP OF THERMOSTAT WITH SLOTS ON MOUNTING PLATE.

B PRESS LOWER EDGE OF CASE TO LATCH.

Fig. 11. Mounting thermostat wallplate.

OPERATION

Setting FAN and SYSTEM Switches

Fan and system settings are controlled manually by using the switches located at the bottom of the thermostat case. See Fig. 12.

FAN Switch

Fan switch settings are:
  On: The fan runs continuously. Use for improved air circulation and air quality.
  Auto: Normal setting for most homes. In cooling, the fan starts and stops with the cooling equipment. In heating, the fan is controlled directly by the heating equipment and may start a few minutes after the heating equipment turns on (on most systems). When using an electric heat thermostat, the fan starts and stops with the heating equipment.

Slide the FAN switch in the bottom left corner of the thermostat to select the desired fan setting.

SYSTEM Switch

System switch settings control thermostat operation as follows:

Cool: The thermostat controls the cooling system.
Off: Both heating and cooling are off.
Heat: The thermostat controls the heating system.

Slide the SYSTEM switch in the bottom right corner of the thermostat to select the desired system setting.
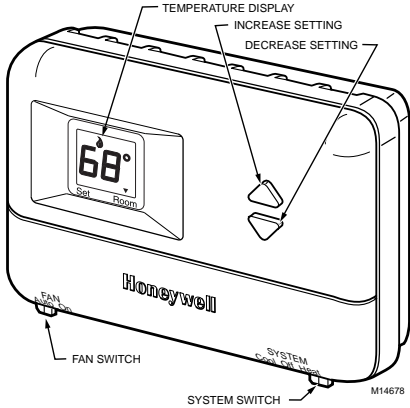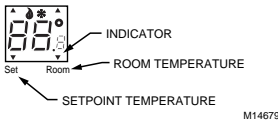

Fig. 12. Digital display and system switches (FAN and SYSTEM).

Set Temperature Setpoint

NOTE: Temperature setpoint range is 40° to 99°F (5° to 37°C).

The temperature setpoint and the room temperature are shown separately on the digital display. The ▼ indicator points to **Set** when the temperature setpoint is displayed and to **Room** when the room temperature is displayed.
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To set temperature setpoint:
1. Select Heat or Cool by sliding the SYSTEM switch in the lower right corner of the thermostat to the desired mode. See Fig. 12.
2. To display the temperature setpoint on the digital display, press either the ▲ or ▼ key once. The temperature setpoint is displayed for approximately five seconds as the indicator points to **Set** and flashes.

3. To increase the temperature setpoint press the ▲ key. Each press changes the setpoint one degree; press and hold to change the setpoint several degrees.

4. To decrease the temperature setpoint press the ▼ key. Each press changes the setpoint one degree; press and hold to change the setpoint several degrees.


Setting °F/°C Indication and Heat Cycle Rate

NOTE: To save changes to the °F/°C indication, the heat cycle rate and the C3/C1 temperature control, tap the ▲ key until exiting the installer setup.

To set the °F/°C indication, the heat cycle rate and the C3/C1 temperature control:
1. If the temperature is displayed in °F, set the temperature setpoint to 52°F. If the room temperature is displayed in °C, set the temperature setpoint to 11°C.
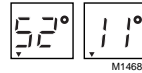

OPTIONAL SYSTEM CHECKOUT
When in steps 2 and 3 only, the ▼ key can be used to turn heat or cool outputs on and off. Change the SYSTEM switch setting to test heat or cool outputs. No action takes place If the system switch is in the Off position.
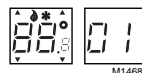
Examples: System setting at HEAT: If heat is on, the ▼ key turns it off; if heat is off, ▼ turns it on.

System setting at COOL: If cool is on, ▼ key turns it off; if cool is off, ▼ turns it on.

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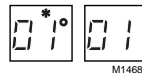
2. Press the ▲▼ keys simultaneously for more than one second to light all segments on display and to enter installer setup mode. When the keys are released, a two-digit software revision code is displayed.

NOTE: In installer setup mode only, each press of the ▲ key momentarily displays 01. Each press of the ▼ key momentarily displays 02. When the keys are released, these two-digit codes are no longer displayed.

3. Press the ▲ key. Factory information is displayed. A typical example is shown, but information displayed varies by model. This information is for factory use only.

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4. Press the ▲ key again to display °C or °F.

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5. Press the ▼ key to change the °C or °F indication.

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6. Press the ▲ key to display the heat cycle rate of 1, 3, 4, 5, 6, 9, or 12. To change the heat cycle rate, press the ▼ key to scroll between 1, 3, 4, 5, 6, 9, or 12. Stop scrolling when the desired rate is displayed. See Table 1 for the cycle rate options and the corresponding system equipment.

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7. Press the ▲ key to display heating/cooling temperature control default..

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8. Press the ▼ key again to change heating/cooling temperature control to C1 or C3.
   C1 = Standard heating/cooling temperature control.
   C3 = Aggressive heating/cooling temperature control (can cause room temperature to overshoot the setpoint).

9. Press the ▲ key again. Factory information (varies by model) is shown.

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Table 1. Heating Cycle Rates.

System	Cycles Per Hour
Steam, gravity	1
Hydronic heat, condensing gas furnace[a]	3
Gas or oil forced air	6
Electric heat	9
Special applications[b]	4, 5, 12

[a]High efficiency furnace.

[b]Refer to equipment manufacturer's instructions.

10. Press the ▲ key to save all changes, exit installer setup mode and return to normal operation.

NOTE: After exiting installer setup mode, slide the System switch to the desired position and change the setpoint to the desired room temperature.

CHECKOUT

Heating

1. Slide the SYSTEM switch to Heat and the FAN switch to Auto.
2. Press and hold the ▲ key to raise the temperature setting several degrees above the room temperature. After approximately ten seconds, the heating equipment should start. In conventional systems, the system turns on the fan through the use of a time delay relay or through a limit control. When using an electric heat thermostat, the fan starts immediately.
3. Press the ▼ key to lower the temperature setting below the room temperature. Heating equipment should stop.

Cooling

⚠ CAUTION

Low Temperature Hazard.
Operating at too low of an outdoor temperature may cause compressor damage.
Do not operate cooling if outdoor temperature is below 50°F (10°C). Refer to manufacturer's recommendations.
- For compressor protection, during power interruption and on initial startup, the T8400 and T8401 Thermostats go into a five-minute delay. During this delay, the cooling icon (a snowflake ❄) flashes.

1. Slide the SYSTEM switch to Cool and the FAN switch to Auto.
2. Press the ▼ key to lower the temperature setting several degrees below the room temperature. After approximately five minutes, the cooling equipment should start. The fan starts and stops with the cooling equipment.

3. Press the ▲ key to raise the temperature setting above the room temperature. Cooling system should shut down.

NOTE: To bypass the five-minute delay, see the Optional System Checkout section.

Fan

1. Slide the SYSTEM switch to Off and the FAN switch to On. The fan should run continuously.
2. Slide the FAN switch to Auto. In heating, the fan is controlled directly by the heating equipment and may start a few minutes after the heating equipment turns on (on most systems). When using an electric heat thermostat, the fan starts and stops with the heating equipment. In cooling, the fan starts and stops with the cooling equipment.

Be sure all equipment responds correctly to the thermostat.

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