

T8411R Electronic Heat Pump Thermostat

PRODUCT DATA



FEATURES

- Attractive styling complements any decor to the homeowner's delight.
- Ease-of-use means fewer homeowner questions and increased homeowner satisfaction.
- Large display for quick easy readability.
- Conveniently sized 5-1/2 in. x 3-1/2 in. thermostat makes it easy to install in a variety of locations.
- Keys are located by the display for easy access.
- Fan and system switches are located on the lower edge to eliminate accidental setting changes.
- Easy installation, setup and self-test saves installer time and increases their productivity.
- Manual changeover from heat to cool eliminates unexpected system operation.
- °F or °C temperature display for added model flexibility.
- Selectable second-stage heating cycle rate (3, 6 or 9 cph). First-stage heating cycle rate is fixed at 3 cph.
- Cooling cycle rate is fixed (3 cph), the standard setting for compressors, for speedy installation.
- Setpoints are permanently held in memory (no batteries used) and retained during power outages for increased installer and homeowner convenience.
- Em Ht and Aux Ht indicators let the homeowner know when these modes are active.

APPLICATION

The T8411R Thermostat provides 24V control of a two-stage heating and one-stage cooling heat pump system with manual changeover from heat to cool and second stage auxiliary heat. First stage heating and cooling cycle rates are fixed at 3 cph. Second-stage heating cycle rate is selectable at 3, 6, or 9 cph. Temperature indication can be set for °F or °C.

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SPECIFICATIONS

IMPORTANT

The specifications given in this publication do not include normal manufacturing tolerances; therefore, an individual unit might not exactly match the listed specifications. Also, this product is tested and calibrated under closely controlled conditions, and some minor differences in performance can be expected if those conditions are changed.

T8411R Standard model includes a thermostat, wallplate (for wiring and mounting thermostat) and owner's guide.

T8411R TRADELINE® model includes a thermostat, wallplate (for wiring and mounting thermostat) and owner's guide.

Power: T8411R: 24 Vac nominal, 18 to 30 Vac, 50/60 Hz.

Electrical Ratings:

First Stage Heating: 0.02 to 1.5A run; 7.5A inrush.
 Second Stage Heating: 0.02 to 1.5A run; 3.5A inrush.
 Cooling: 0.02 to 1.5A run; 7.5A inrush.
 Fan: 0.02 to 0.5A run; 2.5A inrush.
 Emergency Heat Output (E): 0.02 to 1.5A run; 3.5A inrush.
 Heating Changeover Valve (B): 0.02 to 0.5A run; 2.5A inrush.
 Cooling Changeover Valve (O): 0.02 to 0.5A run; 2.5A inrush.
 Emergency Heat Indicator (L): 0.02 to 0.5A run; 2.5A inrush.

Temperature Adjustment: Setpoint is adjusted by using the ▲ or ▼ keys. One press changes the setpoint one degree; pressing and holding changes the setpoint several degrees.

Temperature Setting Range: 40°F to 99°F (4°C to 39°C).

Ambient Temperature Range: 30°F (-1°C) to 110°F (43°C).

Shipping Temperature Range: -20°F (-29°C) to 120°F (49°C).

Operating Relative Humidity: 5% to 90% RH, noncondensing.

Cycle Rates (at 50% Load):

First Stage Heating: Fixed at 3 cph.
 Second Stage Heating: Selectable at 3, 6 or 9 cph.
 Cooling: Fixed at 3 cph.

Finish:

T8411R TRADELINE®: Taupe finish.
 T8411R Standard Models: Premier White® finish and only available in builder packs of 20.

Accessory:

Universal Cover Plate available separately (for covering wall marks): 7 3/8 in. (188 mm) x 5 3/4 in. (146 mm)
 Order part no. 209649A (taupe color).

Dimensions: See Fig. 1.

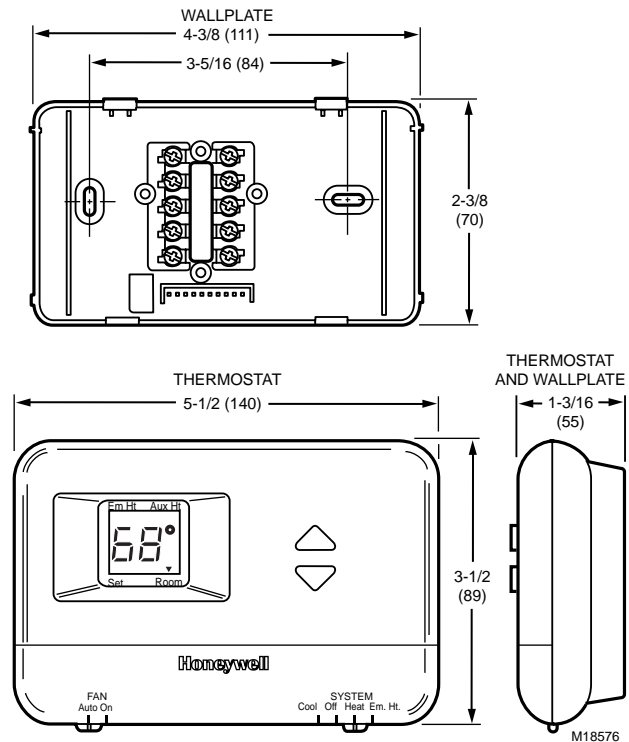


Fig. 1. T8411R Thermostat dimensions in in. (mm).

ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Relations
 Honeywell, 1885 Douglas Drive North
 Minneapolis, Minnesota 55422-4386 (800) 328-5111

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.

International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

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

Damage to Heating/Cooling System Possible. Be careful when handling wires during installation.

Disconnect power at furnace or main breaker/fuse box.



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.

If you have questions, call Honeywell Inc. at 1-800-468-1502.

Location

Install the thermostat about 5 ft (1.5m) above the floor in an area with good air circulation at average room temperature. See Fig. 2. 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 adjusted at the factory. Handle it carefully.

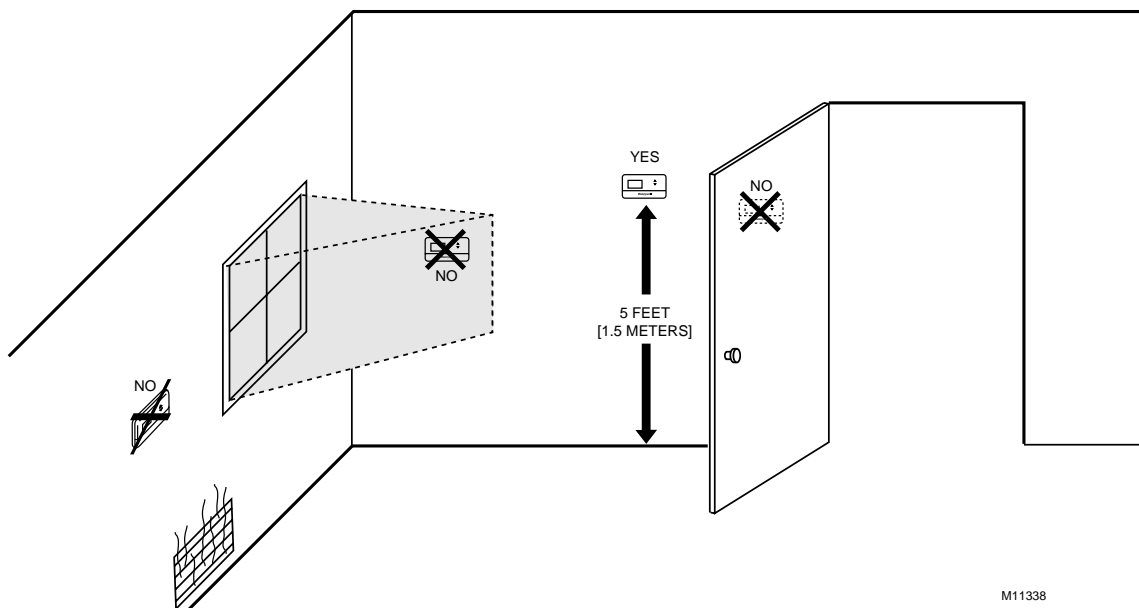
Mounting Wallplate to Wall

IMPORTANT

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

Mount wallplate, T8411R and the screws provided (see Fig. 3) as follows:

1. Position the wallplate at the desired location on the wall.
2. Use a pencil to mark the mounting holes.
3. Remove the wallplate from the wall and drill two 3/16 in. holes in the wall (if drywall) and two 7/32 in. holes for firmer material such as plaster or wood. Gently tap the anchors (provided) into the holes until flush with the wall.
4. Position the wallplate over the holes.
5. Pull the thermostat wire through the entrance hole on the wallplate.



M11338

Fig. 2. Typical location of thermostat.

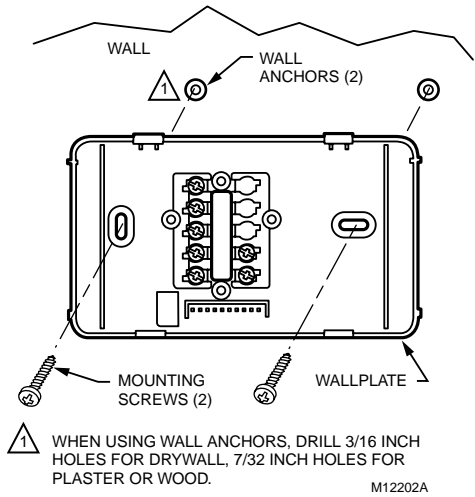


Fig. 3. Mounting wallplate to wall.

Wiring

IMPORTANT

Use 18-gauge thermostat cable for proper wiring.

All wiring must comply with local electrical codes and ordinances.

⚠ CAUTION

Damage to Heating/Cooling System Possible. Be careful when handling wires during installation.

Disconnect power at furnace or main breaker/fuse box.

The shape of the terminals permits insertion of straight or wraparound wiring connections; either method is acceptable. See Fig. 4.

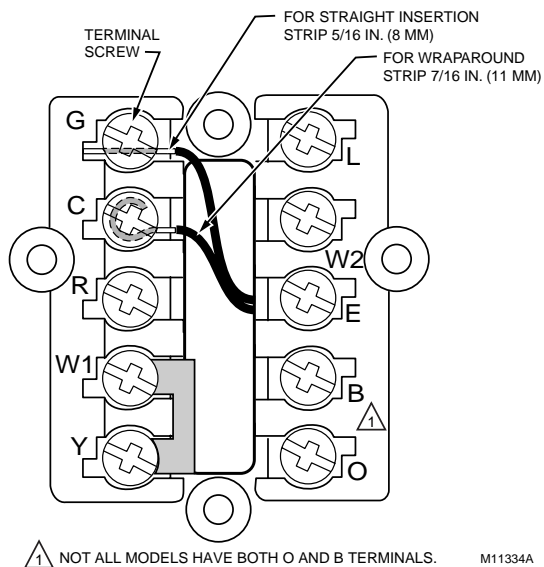


Fig. 4. Wiring connections.

NOTE: Restrict all wiring to the shaded area between the terminals. See Fig. 5.

Refer to Fig. 6 for typical wiring hookup. A letter code is located near each terminal for identification.

1. Loosen the terminal screws on the wallplate and connect the system wires. See Fig. 4.
2. Securely tighten each terminal screw.
3. Push the excess wire back into the hole.
4. Plug the hole with nonflammable insulation to prevent drafts from affecting the thermostat.

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. 7.

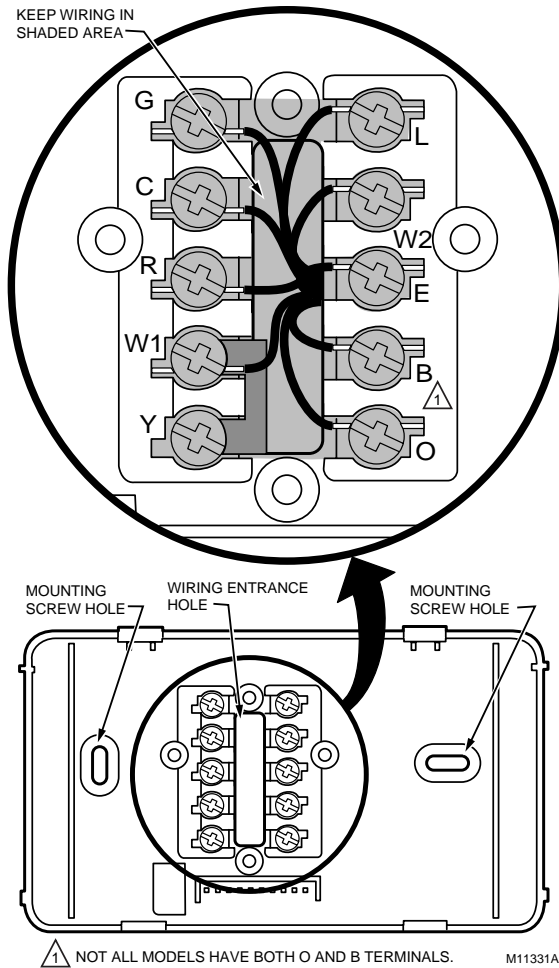


Fig. 5. Restrict wiring to shaded area.

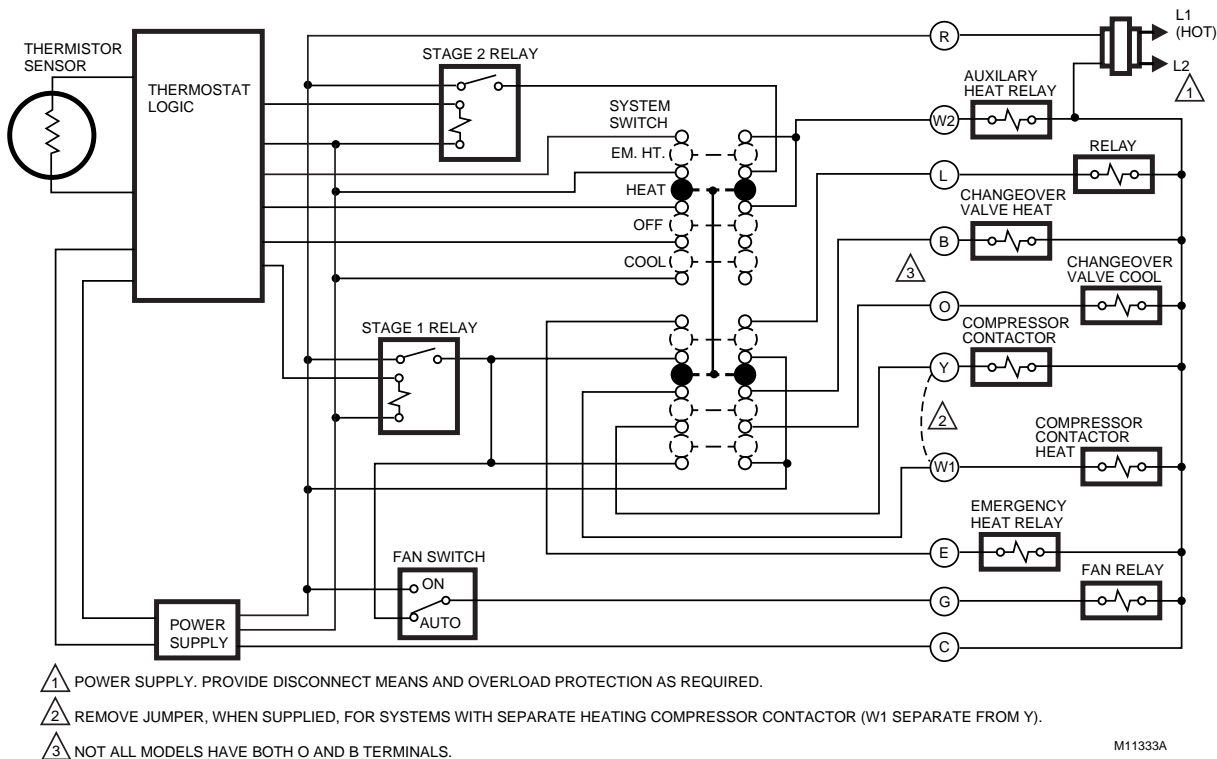


Fig. 6. T8411R two-stage heat, one-stage cool wiring diagram with manual changeover.

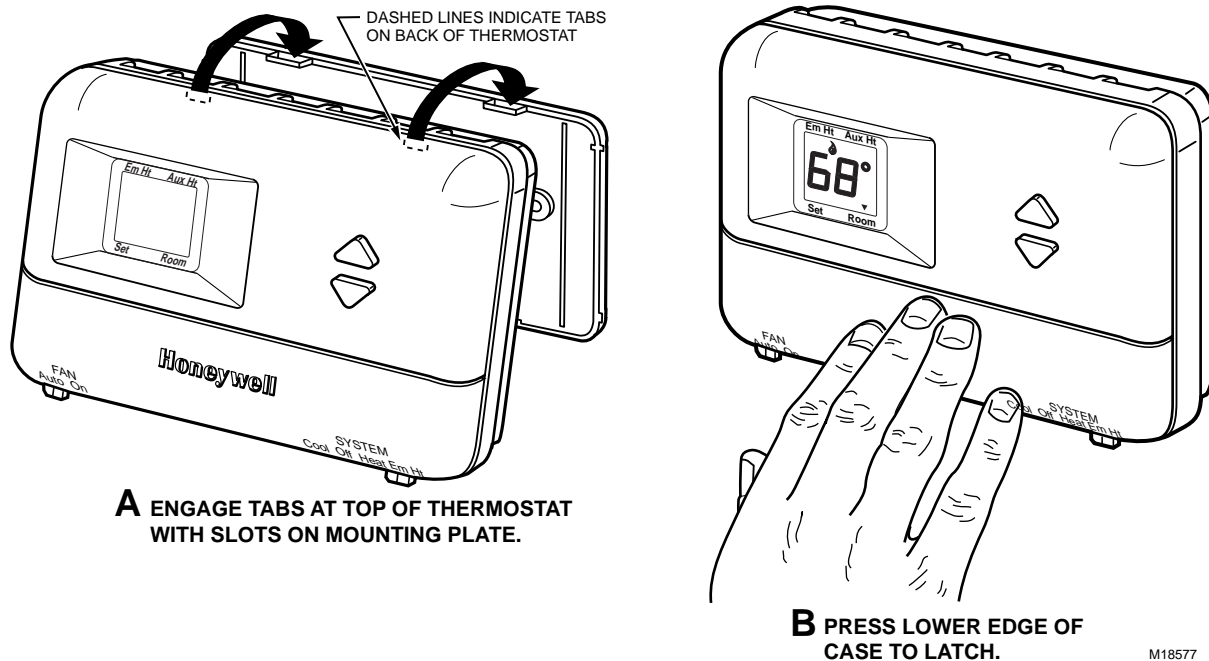


Fig. 7. Mounting thermostat to wallplate.

SETTINGS AND ADJUSTMENTS

Setting Fan and System Switches

Fan and system settings are controlled manually using the switches located at the bottom of the thermostat case. See Fig. 8.

Fan Switch

Fan switch settings are:

On: The fan runs continuously. Use for improved air circulation.

Auto: Normal setting for most homes. The fan starts and stops with the equipment.

Slide the 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.

Heat: The thermostat controls the heating system.

Off: Both heating and cooling are off.

Em. Ht: Thermostat cycles auxiliary heat (W2) and emergency heat relay (E) as needed to maintain setpoint. Terminal L is energized continuously. (Fault heat relay is on continuously.) Cooling system is off. Compressor is de-energized.

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

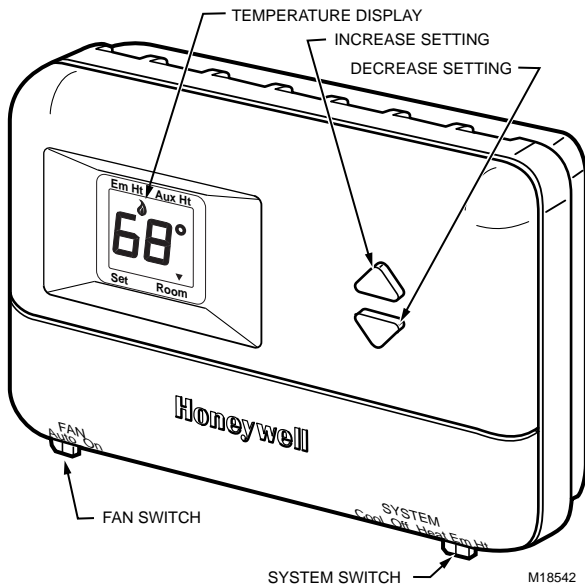


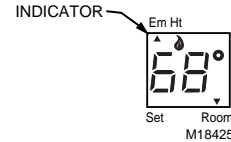
Fig. 8. Temperature display and system switches.

Em Ht and Aux Ht Indications

The ▲ indicator points to either Emergency Heat (Em Ht) or Auxiliary Heat (Aux Ht) when these modes are active.

Em Ht: The ▲ indicator points to Em Ht when the SYSTEM switch is set at Em Ht.

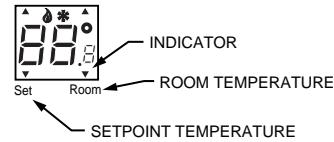
Aux Ht: The ▲ indicator points to Aux Ht when auxiliary backup heat is needed to help handle the heating load.






Set Temperature Setpoint

NOTE: Temperature setpoint range is 40° to 99°F (4° to 39°C).

The temperature setpoint and the room temperature are shown separately on the display. The ▼ indicator points to Set when the temperature setpoint is displayed and to Room when the room temperature is displayed.



To set temperature setpoint:

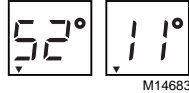
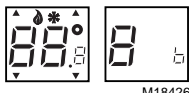
1. Select Heat or Cool by sliding the SYSTEM switch in the lower right corner of the thermostat to the desired mode. See Fig. 8.
2. To display the selected temperature setpoint on the digital display, press either the ▲ or ▼ key once. The temperature setpoint is displayed for approximately five seconds as the indicator points to Set and flashes.  M14680
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.  M14681
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.  M14682

Setting °F/°C Indication and Heat Cycle Rate

NOTE: To save changes to the °F/°C indication and the heat cycle rate, all seven steps must be completed.

In installer setup mode steps 2. through 5., each press of the ▲ key momentarily displays 01 and each press of the ▼ key momentarily displays 02. When the keys are released, these two-digit codes are no longer displayed.

To set the °F/°C indication and heat cycle rate:

1. If the room 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.  M14683
2. Press the ▲▼ keys simultaneously for more than two seconds to light all segments on the display and to enter installer setup mode. When the keys are released, a two-digit software code is displayed.  M18426

OPTIONAL SYSTEM CHECKOUT
 When the heat or cool outputs are turned on, the five-minute off-timer safety feature is bypassed.

 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.

The following examples of system settings show a two digit software code on the display. The code shown is only an example; codes can vary.

System setting at Heat:

To turn heat on, press the ▼ key.



To turn auxiliary heat on, press the ▼ key.



To turn auxiliary heat off, press the ▼ key a third time.



To turn heat off, press the ▼ key a fourth time.



System setting at Cool:

To turn cool on, press the ▼ key.



To turn cool off, press the ▼ key.



3. Press the ▲ key. Factory information is displayed. Information displayed varies by model. This information is only for factory use.
4. Press the ▲ key again to display °C or °F.



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

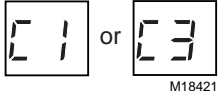



NOTE: Stage one heat and cool cycle rates are fixed at 3 cph. Only stage two heat cycle rates are selectable.

6. Press the ▲ key to display the heat cycle rate of 3, 6, or 9. If the desired cycle is displayed, press the ▲ key to exit the installer setup



mode. To change the heat cycle rate, press the ▼ key to scroll between 3, 6, and 9. Stop scrolling when the desired rate is displayed.

7. Press the ▲ key to display cooling algorithm configuration default.  M18421
8. Press the ▲ key again to change cooling algorithm to C1 or C3.
 C1 = Standard cooling algorithm.
 C3 = Aggressive cooling algorithm (can cause overshooting).
9. Press the ▲ key again. Current configuration (CC) is displayed. A typical example is shown, but CC varies by model. This information is for factory use only.  M18420
10. Press ▲ to save all changes, exit installer setup mode and return to normal operation.

NOTE: After exiting installer setup mode, change the setpoint to the desired room temperature.

OPERATION

The T8411R Thermostat provides two-stage heat and one-stage cool temperature control with proportional plus integral control to eliminate droop.

Comfort Period

In mild weather, the heat pump cycles continuously to maintain the sensed temperature within 1°F of the setpoint. In moderate weather, the heat pump cycles longer, minimizing the need for auxiliary heat. The heat pump runs the majority of the time in severe weather and only shuts off for brief periods using auxiliary heat to maintain temperature within 1°F of setpoint.

Thermal Performance

During severe weather, the T8411R actually controls closer to the setpoint than a conventional control. This is because the heat anticipator is replaced by two electronic control strategies— cycling by heat anticipation and proportional plus integral (P+I) control.

Electronic cycling by heat anticipation acts like a traditional heat anticipator except that it never needs adjusting for various con-trol circuit load currents. It cycles off the heating system slightly before the room temperature reaches the setpoint to keep heat that remains in the ductwork from overheating the room.

In severe weather, a conventional control with a heat anticipator tends to turn off the system too soon so the effective setpoint is somewhat below the setpoint. In very cold weather, the difference between setpoint and effective control point can be 5°F or 6°F (2°C or 3°C) with a conventional control. This phenomenon is called droop.

Proportional plus integral action eliminates droop by adjusting the on time of the stage until the control point matches the setpoint. The T8411R maintains the space temperature within 1°F of the setpoint.

This zero droop performance provides improved occupant comfort and energy savings. Occupants do not need to continually adjust thermostat settings to maintain desired temperature, even during severe weather.

Sequence of Operations

The Fan, Heat and Cool outputs are relay controlled. A loss of ac power, or a change in the SYSTEM switch setting can cause the outputs to turn off. Table 1 shows the sequence of operations for the Fan settings and System modes.

Fan Control

The FAN switch settings are On and Auto.

On: The fan runs continuously.

Auto: The fan starts and stops with the equipment.

Heat Mode

With the SYSTEM switch in the Heat position, the thermostat controls the heating system. On a call for heat, the W and G terminals are energized and a flame is shown on the digital display. The B terminal is powered continuously while system switch is in Heat.

Cool Mode

With the SYSTEM switch in the Cool position, the thermostat controls the cooling system. On a call for cool, the G and Y terminals are energized and a snowflake is shown on the digital display. The O terminal is powered continuously while system switch is in Cool.

Em. Ht. Mode

With the system switch at Em. Ht., the thermostat controls Em. Ht. On a call for emergency heat, the E, G and L terminals are energized and an indicator is displayed on the LDD. The L terminal is powered continuously while system switch is in Em. Ht. In severe weather, the W2 terminal can also energize.

Minimum Off-Timing

A minimum off-timer in the T8411R assures that the compressor does not come on again for at least five minutes after it turns off. The minimum-off timer is triggered when the compressor turns off. If the compressor turns off when the setpoint is changed, then the minimum-off timer is triggered. Power interruption and power restoration also trigger the minimum off-timer which operates on the first stage of heating and cooling.

Table 1. Sequence of Operations.

FAN Switch Settings	SYSTEM Switch Settings	Call for Action	Energize Terminals	Display Icons
Auto	Cool	None	O	None
		Cooling	O, Y, G	❄
	Heat	None	B	None
		Stage 1 heat	B, W1, G	🔥
		Stage 2 heat	B, W1, W2, G	🔥, Aux Ht indicator
	Em Ht	None	L	Em Ht indicator
		Stage 1 heat	L, E, G	🔥, Em Ht indicator
		Stage 2 heat	L, E, W2, G	🔥, Em Ht and Aux Ht indicators

^a The O terminal is powered continuously in cooling, the B terminal is powered continuously in heating and the L terminal is powered continuously in emergency heat as a function of the system switch position even without a call for heat or cool.

CHECKOUT

Heating

- Slide the SYSTEM switch to Heat and the FAN switch to Auto.
- Press and hold the s key to raise the temperature setting several degrees above the room temperature. After approximately five minutes the W1 and G terminals are energized and the heating equipment starts.
- Press the ▼ key to lower the temperature setting below the room temperature. Heating equipment should stop.

Cooling

⚠ CAUTION

Compressor Damage Hazard
Operating at too low of an outdoor temperature can cause compressor damage.

Do not operate cooling if outdoor temperature is below 50°F (10°C). Refer to manufacturer recommendations. Allow the compressor to remain off for five minutes before restarting.

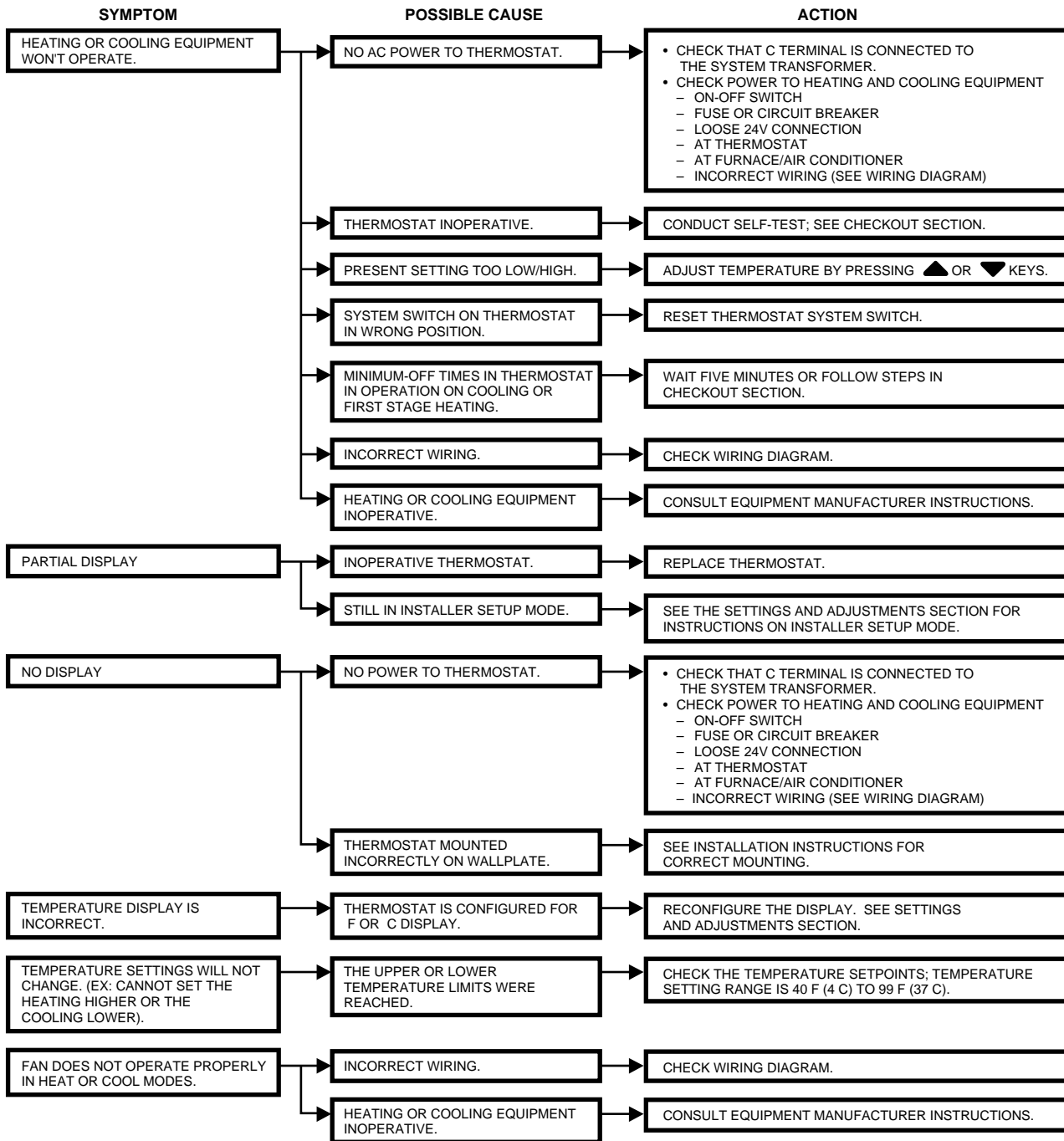
- Slide the SYSTEM switch to Cool and the FAN switch to Auto.
- Press the ▼ key to lower the temperature setting several degrees below the room temperature. After approximately five minutes the G and Y terminals are energized and the cooling equipment starts.
- Press the ▲ key to raise the temperature setting above the room temperature. Cooling system should shut down.

Fan

- Slide the SYSTEM switch to Off and the FAN switch to On. The fan should run continuously.
- Slide the FAN switch to Auto. The system turns the fan on or off with the equipment.

Make certain all equipment responds properly to the thermostat.

TROUBLESHOOTING



M10291B

Honeywell

Home and Building Control

Honeywell
1985 Douglas Drive North
Golden Valley, MN 55422

Home and Building Control

Honeywell Limited-Honeywell Limitée
35 Dynamic Drive
Scarborough, Ontario
M1V 4Z9

