



WHITE-RODGERS

1F86-244

Non-Programmable Electronic Digital Thermostat

**INSTALLATION AND
OPERATION INSTRUCTIONS**

Operator: Save these instructions for future use!

**FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY
BEFORE INSTALLING OR OPERATING THIS CONTROL COULD CAUSE
PERSONAL INJURY AND/OR PROPERTY DAMAGE.**

DESCRIPTION

Your new White-Rodgers Digital Thermostat uses the technology of a solid-state microcomputer to provide precise temperature control.

Features:

- Simultaneous heat and cool set point storage
- Pre-set temperature control
- Backlit display
- Battery powered (2 "AA" Energizer® alkaline batteries included)

- LCD continuously displays set point and room temperature
- °F/°C convertibility
- Temperature range 45° to 90°F
- RC, RH, W, Y, G, O and B terminals
- B and O terminals for single stage heat pumps (no auxiliary heat) or damper operation
- Set point storage in case of power loss

PRECAUTIONS

This thermostat is intended for use with a low voltage system; do not use this thermostat with a line voltage system. If in doubt about whether your wiring is millivolt, line, or low voltage, have it inspected by a qualified heating and air conditioning contractor or electrician.

Do not exceed the specification ratings.

All wiring must conform to local and national electrical codes and ordinances.

This control is a precision instrument, and should be handled carefully. Rough handling or distorting components could cause the control to malfunction.

⚠ WARNING

Do not use on circuits exceeding specified voltage. Higher voltage will damage control and could cause shock or fire hazard.

Do not short out terminals on gas valve or primary control to test. Short or incorrect wiring will damage thermostat and could cause personal injury and/or property damage.

Thermostat installation and all components of the system shall conform to Class II circuits per the NEC code.

⚠ CAUTION

To prevent electrical shock and/or equipment damage, disconnect electric power to system at main fuse or circuit breaker box until installation is complete.

SPECIFICATIONS

ELECTRICAL DATA

Electrical Rating:

- 8 to 30 VAC 50/60 Hz. or D.C.
- 0.05 to 1.0 Amps (Load per terminal)
- 1.5 Amps Maximum Total Load** (All terminals combined)

THERMAL DATA

Setpoint Temperature Range:

45°F to 90°F (7°C to 32°C)

Operating Ambient Temperature Range:

32°F to 105°F

Operating Humidity Range:

0 to 90% RH (non-condensing)

Shipping Temperature Range:

-4°F to 150°F

APPLICATIONS

For use with:

- Standard heat/cool or heat only systems
- Electric heat systems
- Gas or oil fired systems
- Gas systems with intermittent ignition devices (I.I.D.) and/or vent dampers
- Hydronic (hot water or steam) systems
- Single-stage heat pump systems (no auxiliary heat)
- Millivolt systems

DO NOT USE WITH:

- Multi-stage systems
- Systems exceeding 30 VAC and 1.5 amps
- 3-wire zoned hydronic heating systems



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INSTALLATION

REMOVE OLD THERMOSTAT

1. Shut off electricity at the main fuse box until installation is complete. Ensure that electrical power is disconnected.
2. Remove the front cover of the old thermostat. **With wires still attached**, remove wall plate from the wall. If the old thermostat has a wall mounting plate, remove the thermostat and the wall mounting plate as an assembly.
3. **Identify each wire attached to the old thermostat using the labels enclosed with the new thermostat.**
4. Disconnect the wires from old thermostat one at a time. **DO NOT LET WIRES FALL BACK INTO THE WALL.**
5. Install new thermostat using the following procedures.

ATTENTION!

This product does not contain mercury. However, this product may replace a unit which contains mercury.

Do not open mercury cells. If a cell becomes damaged, do not touch any spilled mercury. Wearing nonabsorbent gloves, take up the spilled mercury with sand or other absorbent material and place into a container which can be sealed. If a cell becomes damaged, the unit should be discarded.

Mercury must not be discarded in household trash. When the unit this product is replacing is to be discarded, place in a suitable container and return to White-Rodgers at 9797 Reavis Road, St. Louis, MO, 63123-5398 for proper disposal.

ELECTRIC HEAT OR SINGLE-STAGE HEAT PUMP SYSTEMS

This thermostat is configured from the factory to operate a heat/cool, fossil fuel (gas, oil, etc.), forced air system. It is configured correctly for any system that DOES NOT require the thermostat to energize the fan on a call for heat. If your system is an electric heat or heat-pump system that REQUIRES the thermostat to turn on the fan on a call for heat, locate the **GAS/ELECTRIC switch** on the back of the thermostat (see fig. 1) and switch it to the **ELECTRIC** position. This will allow the thermostat to energize the fan immediately on a call for heat. If you are unsure if the heating/cooling system requires the thermostat to control the fan, contact a qualified heating and air conditioning service person.

ATTACH THERMOSTAT BASE TO WALL

1. Remove the packing material from the thermostat. Gently pull the cover straight off the base. Forcing or prying on the thermostat will cause damage to the unit. If necessary, move the electric heat switch (see **ELECTRIC HEAT SYSTEMS**, above).
2. Connect wires beneath terminal screws on base using appropriate wiring schematic (see figs. 2 through 7).
3. Place base over hole in wall and mark mounting hole locations on wall using base as a template.
4. Move base out of the way. Drill mounting holes.
5. Fasten base loosely to wall, as shown in fig. 1, using two mounting screws. Place a level against bottom of base, adjust until level, and then tighten screws. (Leveling is for appearance only and will not affect thermostat operation.) If you are using existing mounting holes, or if holes drilled are too large and do not allow you to tighten base snugly, use plastic screw anchors to secure subbase.

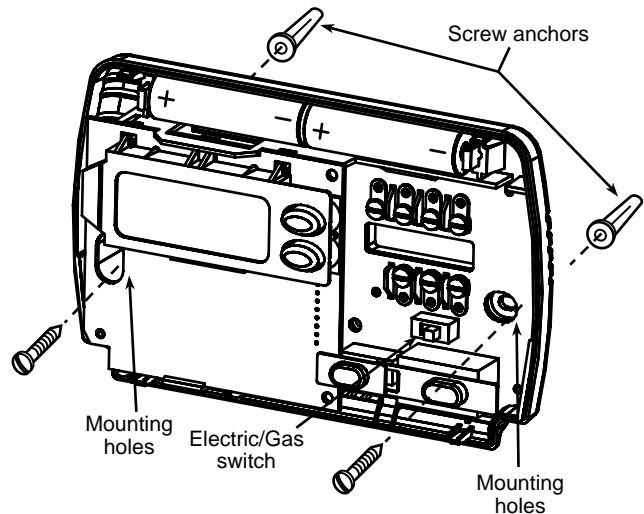


Figure 1. Thermostat Base

6. Push excess wire into wall and plug hole with a fire-resistant material (such as fiberglass insulation) to prevent drafts from affecting thermostat operation.

BATTERY LOCATION

This thermostat requires 2 "AA" alkaline batteries to operate. Batteries are included in the thermostat at the factory with a battery tag to prevent power drainage. **You must remove the battery tag to engage the batteries** and provide power to the thermostat.

If LO BATTERY is displayed, the batteries are low and should be replaced with fresh "AA" Energizer® alkaline batteries. To replace batteries, install the batteries along the top of the base (see Fig. 1). The batteries must be installed with the positive (+) end to the left.

HYDRONIC (HOT WATER OR STEAM) HEATING SYSTEMS

This thermostat is set to operate properly with a forced-air heating system. If you have a hydronic heating system (a system that heats with hot water or steam), you must set the thermostat to operate properly with your system. Change the second option in the configuration menu to SL (see CONFIGURATION MENU, page 4).

CHECK THERMOSTAT OPERATION

If at any time during testing your system does not operate properly, contact a qualified service person.

Turn on power to the system.

Fan Operation

If your system **does not** have a **G** terminal connection, skip to **Heating System**.

1. Move fan switch to **ON** position. The blower should begin to operate.
2. Move fan switch to **AUTO** position. The blower should stop immediately.

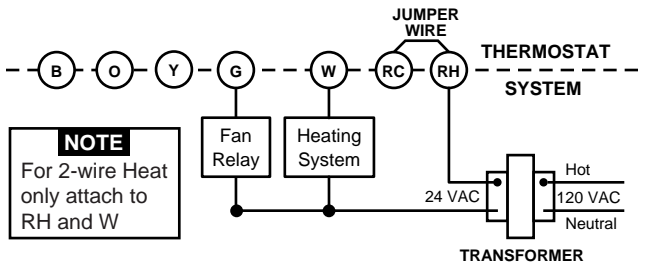


Figure 2. Typical wiring diagram for heat only, 3-wire, single transformer systems

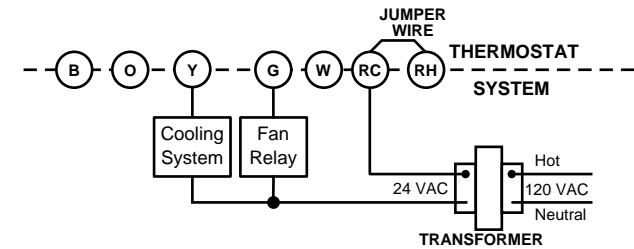


Figure 3. Typical wiring diagram for cool only, 3-wire, single transformer systems

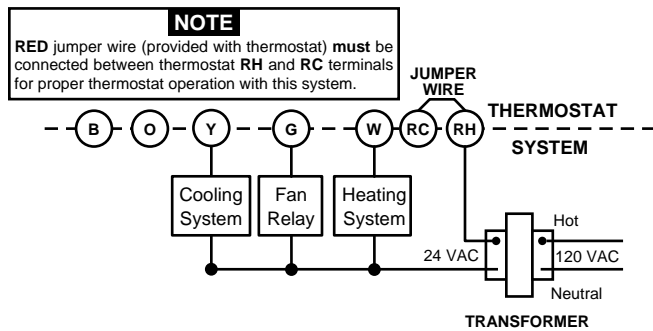


Figure 4. Typical wiring diagram for heat/cool, 4-wire, single transformer systems

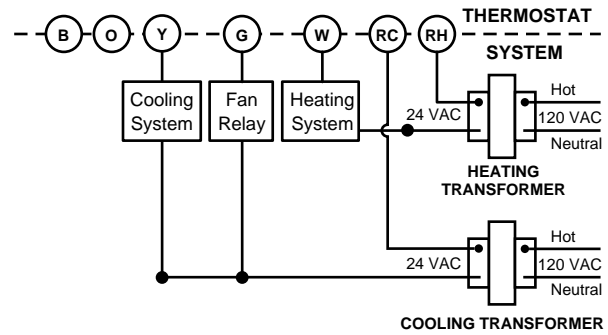
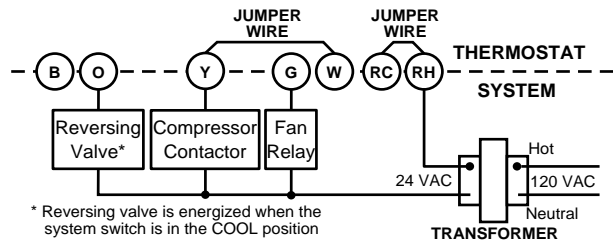
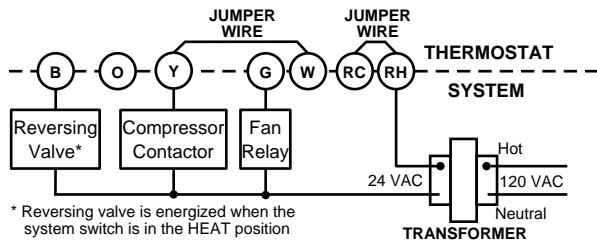


Figure 5. Typical wiring diagram for heat/cool, 5-wire, two-transformer systems



* Reversing valve is energized when the system switch is in the COOL position

Figure 6. Typical wiring diagram for heat pump with reversing valve energized in COOL



* Reversing valve is energized when the system switch is in the HEAT position

Figure 7. Typical wiring diagram for heat pump with reversing valve energized in HEAT

Heating System

1. Move SYSTEM switch to **HEAT** position. If the heating system has a standing pilot, be sure to light it.
2. Press to adjust thermostat setting above room temperature. The heating system should begin to operate.
3. Press to adjust temperature setting below room temperature. The heating system should stop operating.

Cooling System

⚠ CAUTION

To prevent compressor and/or property damage, if the outdoor temperature is below 50°F, DO NOT operate the cooling system.

1. Move SYSTEM switch to **COOL** position.
2. Press to adjust thermostat setting below room temperature. The blower should come on immediately on high speed, followed by cold air circulation
3. Press to adjust temperature setting above room temperature. The cooling system should stop operating.

OPERATION

Before you begin using your thermostat, you should be familiar with its features and with the display and the location and operation of the thermostat buttons. Your thermostat consists of two parts: the **thermostat cover** and the **base**. To remove the cover, pull it straight out from the base. To replace the cover, line up the cover with the base and press until the cover snaps onto the base.

The Thermostat Buttons and Switches (see fig. 8)

- ① Raises temperature setting.
- ② Lowers temperature setting.
- ③ FAN switch (ON, AUTO).
- ④ SYSTEM switch (COOL, OFF, HEAT).

The Display

- ⑤ **Flame icon** (Δ) is displayed when the SYSTEM switch is in the HEAT position. **Snowflake icon** (*) is displayed (non-flashing) when the SYSTEM switch is in the COOL position. **Snowflake** is displayed (flashing) if the thermostat is in lockout mode to prevent the compressor from cycling too quickly.
- ⑥ Displays current temperature.
- ⑦ Displays **FILTER** when the system has run for the selected filter time period as a reminder to change or clean your air filter.
- ⑧ Displays set point temperature (this is blank when SYSTEM switch is in the OFF position).
- ⑨ Displays **BATTERY** and **LO** in the current temperature location when the 2 "AA" batteries are low and should be replaced.

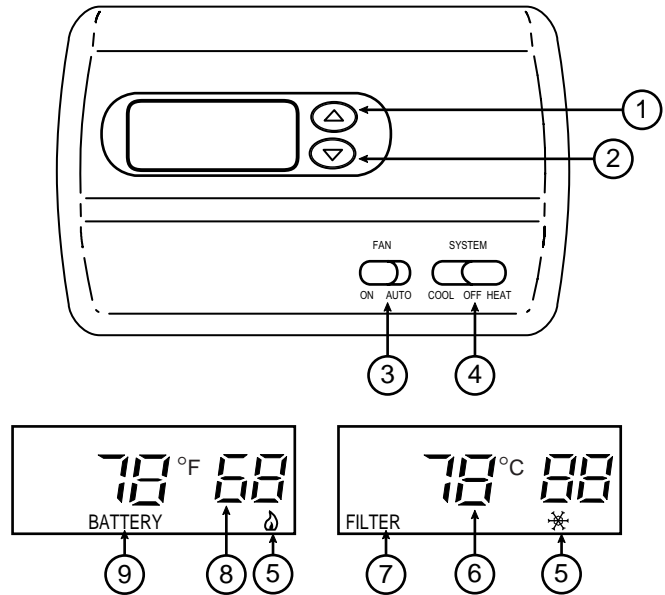


Figure 8. Thermostat display, buttons, and switches

CONFIGURATION MENU

The configuration menu allows you to set certain thermostat operating characteristics to your system or personal requirements.

Move SYSTEM switch to the OFF position, then press Δ and ∇ at the same time to enter the configuration menu. The display will show the first item in the configuration menu.



The configuration menu chart below summarizes the configuration options. An explanation of each option follows.

Press Δ and ∇ to change to the next menu item. To exit the menu, move the SYSTEM switch to HEAT or COOL. If no keys are pressed within fifteen minutes, the thermostat will exit the configuration menu.

Configuration Menu

Step	Press Button(s)	Displayed (Factory Default)	Press Δ or ∇ to select:	COMMENTS
1	Set SYSTEM switch to OFF			SYSTEM switch must be OFF to configure thermostat options
2	Δ and ∇	Φ (FA)	SL	Select FA or SL (Fast or Slow) heating cycle rate
3	Δ and ∇	d-L (ON)	OFF	Select display backlight OFF or ON
4	Δ and ∇	FILTER (000)	0 to 1950 hours (in 50 hour increments)	Select Filter replacement run time
5	Δ and ∇	LOC (OFF)	ON	Select Compressor lockout OFF or ON
6	Δ and ∇	0 HI (0)	4 LO to 4 HI	Select temperature display adjustment higher or lower
7	Δ and ∇	(°F)	°C	Select temperature display to °F or °C
8	Set SYSTEM switch to HEAT or COOL			Returns to normal operation

* Press Δ and ∇ to advance to next item



- 2) **Select FA or SL (Fast or Slow) Heating Cycle Rate** - The FA setting is frequently used for gas, oil or electric heat. The SL setting produces a longer heating cycle which is normally for hot water or steam (hydronic) systems. Both settings produce very accurate temperature control and can be set to your personal preference. FA cycles the system just under 1°F and the SL setting cycles at approximately 1.5°F.
- 3) **Select Display Backlight (d-L OFF or ON)** - The display backlight improves display contrast in low lighting conditions. Selecting backlight ON will keep the light on for a short period of time after any key is pressed. Selecting OFF will keep the light off.
- 4) **Select filter replacement run time** - The thermostat will display **FILTER** after the selected time of operation. This is a reminder to change or clean your air filter. This time can be set from 0 to 1950 hours in 50 hour increments. **A selection of 000 will cancel this feature.** When **FILTER** is displayed, you can clear it by pressing  and  at the same time. This resets the timer and starts counting the hours until the next filter change.
- 5) **Select Compressor Lockout (LOC OFF or ON)** - Selecting LOC ON will cause the thermostat to wait 5 minutes before turning on the compressor if the heating and cooling system loses power. It will also wait 5 minutes minimum between cooling cycles. This is intended to help protect the compressor from short cycling. Some newer compressors already have a time delay built in and do not require this feature. Your compressor manufacturer can tell you if the feature is already present in their system. When the compressor time delay occurs it will flash the (snowflake icon) for about five minutes then turn on the compressor.
- 6) **Select Temperature Display Adjustment (4 LO to 4 HI)** - Allows you to adjust the room temperature display 4° higher or lower. Your thermostat was accurately calibrated at the factory but you have the option to change the display temperature to match your previous thermostat.
- 7) **Select Temperature Display (°F or °C)** - Changes the display readout to Celsius or Fahrenheit as required.

OPERATING FEATURES

Now that you are familiar with the thermostat buttons and display, read the following information to learn about the many features of the thermostat.

- **SIMULTANEOUS HEATING/COOLING SETPOINT STORAGE** — You can enter both your heating and cooling set points at the same time. There is no need to change the thermostat at the beginning of each season.
- **CONFIGURATION MENU** — Allows you to customize certain thermostat options.

SETTING THE THERMOSTAT

This thermostat is very easy to operate. Set the SYSTEM switch to either HEAT or COOL then press  or  until the temperature you want to maintain is shown on the right side of the display. If you want to turn the system off, just move the SYSTEM switch to OFF.

The FAN switch controls the fan operation. When the FAN switch is set to AUTO, the fan will cycle with the furnace or air conditioner. When the FAN switch is set to ON, the fan will run continuously, regardless of SYSTEM switch position.

TROUBLESHOOTING

No Heating

With the SYSTEM switch set to **HEAT**, when the setpoint temperature is raised or lowered past the room temperature, the thermostat will make a soft click sound. Usually, the sound indicates the thermostat is operating correctly. If the system does not come on, check the system or contact your heating/cooling service person. If the thermostat does not click try the Reset Operation listed below.



No Cooling

Same procedure as heating except set SYSTEM switch to **COOL**. There can be up to a 5 minute compressor lock-out time delay before the thermostat clicks in **COOL**.

Blank Display

A blank digital display usually indicates the thermostat has received a voltage spike, static discharge or requires new batteries. If the display remains blank after replacing the batteries, see Reset Operation below.

Reset Operation

If a voltage spike or static discharge blanks out the display or causes erratic thermostat operation you can reset the thermostat by pressing ,  and move the SYSTEM switch from OFF to HEAT at the same time. **This also resets the factory defaults to the configuration menu.** If the thermostat has power, has been reset and still does not function correctly contact your heating/cooling service person or place of purchase.

