

White-Rodgers 70 Series™

Single Stage



Single Stage Thermostat

- Digital 5/2 Day Programmable or Non-Programmable
- Battery Powered

1E78-151

Single Stage
5/2 Day Programmable

1E78-144

Single Stage
Non-Programmable

1E78-140

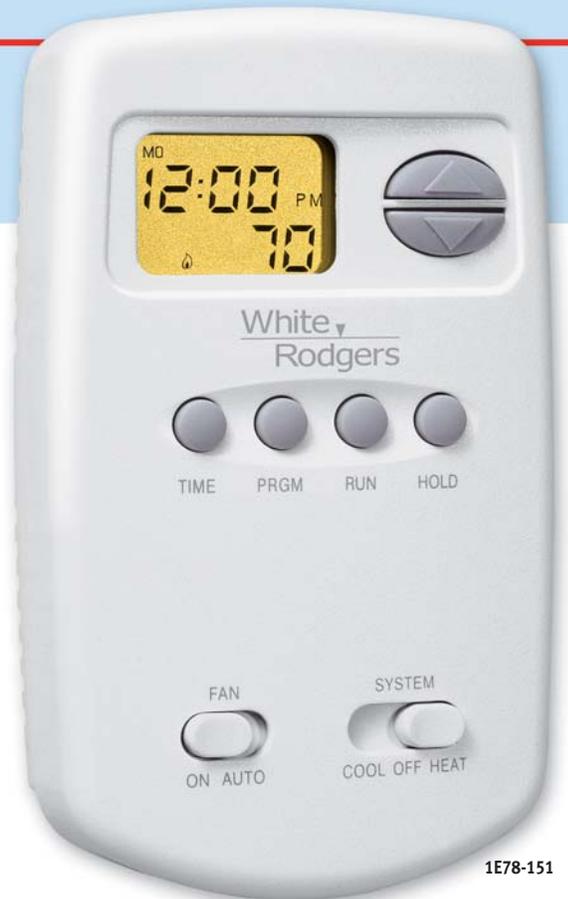
Single Stage/Heat Only
Non-Programmable



1E78-144



1E78-140



1E78-151

The Digital Thermostat That Builds Your Business And Flexes Your Inventory.

The vertical 70 Series™ thermostats build your new construction business. It's the first series of flexible thermostats enabling customers to wire and mount one subbase for use with the temporary new construction thermostat and easily snap on an upgrade to any 1E78 digital model upon building completion. The vertical 70 Series low-profile design blends narrow width with new home decors. The universal subbase, for use with all 1E78 models, is designed

to mount on a 2" x 4" junction box or directly to the wall. There is also an optional wallplate for use in retro-fit applications. The 70 Series thermostats are battery powered, making them easy to install and compatible with most heating and cooling systems. The vertical 70 Series is perfect for new construction customers who want a quick and easy transition to job completion.

White-Rodgers 70 Series™ Single Stage Thermostat

1E78-151
5/2 Day Programmable

1E78-144
Non-Programmable

1E78-140
Non-Programmable, Heat only

Programming

Choice of 5/2 day programming (weekday/weekend) or non-programmable

4 time and 4 temperature settings per program for heating and cooling (1E78-151)

Energy savings up to 33%

Display

Large, easy-to-read thermostat display
Lighted display for easier low-light viewing

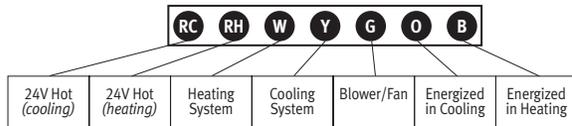
Comfort & Convenience

Electronic temperature accuracy
Adjustable room temperature calibration

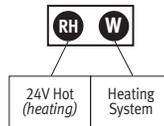
Performance

B & O terminals
Meets California Building Code, Title 24 (1E78-151)
Millivolt compatible
Battery-powered thermostat for maximum compatibility (2 "AAA" premium brand batteries included)
Maintains room temperature differential within +/- 1 degree

Terminal Designations (1E78-151, 1E78-144, F4-1748)



Terminal Designations (1E78-140)



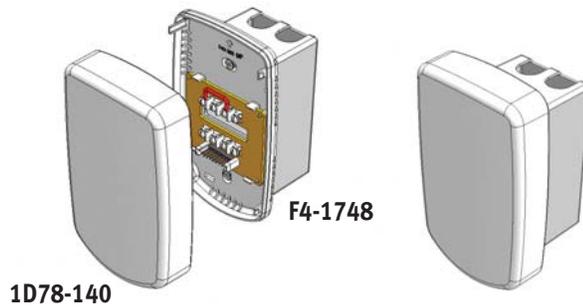
Wall Plate F61-2593



"New Construction Stat" 1D78-140



F4-1748 Subbase mounted on 2" x 4" Junction Box (not supplied) with 1D78-140 "New Construction Stat"



Dimensions

3.25"W x 5.3"H x 1.1"D

Electrical Specifications

Rating

0 to 30 VAC, 50/60 Hz or DC

0.05 to 1.0 Amp (load per terminal)

1.5 Amps maximum load (all terminals combined)

Standard Systems

Single stage gas, oil, electric

Single stage heat pump (1E78-151 and 1E78-144)

Millivolt compatible

Thermal Specifications

Setpoint Temperature Range:
45° to 90°F (7° to 32°C)

Rated Differential:
0.6° to 1.9°F with adjustable anticipation

Operating Ambient Temperature:
32° to 105°F (0° to 40°C)

Operating Humidity Range:
90% non-condensing maximum

Shipping Temperature Range:
-40° to 150°F (-40° to 65°C)

Accessories

Wall Plate F61-2593 (4.5"W x 6.6"H)

Subbase F4-1748 (3.25"W x 5.3"H)

"New Construction Stat" 1D78-140 with heat only 65 setpoint (Must be used with F4-1748 subbase)

Thermostat Guard F29-0143 (For additional guard options refer to White-Rodgers catalog)

For Additional Information

Visit www.white-rodders.com

WHITE-RODGERS 70 SERIES THERMOSTATS

White
Rodgers



1F78-151



1F73-174



1E78-151



1E78-144

70 SERIES THERMOSTATS

Residential Single Stage, Multi-Stage and Heat Pump Applications. 70 Series are the Perfect Upgrade from Mechanical Thermostats. Covers Wall Marks Left by Most Mechanical Thermostats Without the Need for an Extra Wall Plate

FEATURES

- Fossil fuel or electric heat compatible.
- Large LCD with backlight.
- Selectable Celsius or Fahrenheit temperature display.
- Includes B/O terminals.
- Electronic accuracy.

SPECIFICATIONS

Electrical Rating Single Stage	mV to 30 VAC, NEC Class II, 50/60 Hz or DC
Electrical Rating Staging	20 to 30 VAC, NEC Class II
Terminal Load	1.0 A per terminal, 1.5A maximum all terminals combined
Setpoint Range	45 to 90°F (7 to 32°C)
Anticipation, Heating	Adjustable
Anticipation, Cooling Staging	Adjustable
Anticipation, Cooling Single Stage	Fixed
Rated Differential, Staging	Heat & Cool 0.75 or 1.2°F
Operating Ambient	32 to +105°F (0 to +41°C)
Operating Humidity	90% non-condensing max.
Shipping Temperature Range	-4 to +150°F (-20 to +65°C)
Dimensions	3 ³ / ₄ " H x 5 ¹ / ₈ " W x 1 ¹ / ₈ " D – (1F78) 5 ¹ / ₄ " H x 3 ³ / ₁₆ " W x 1 ³ / ₁₆ " D – (1E78)

PARTS AND ACCESSORIES See end of this section for additional parts and accessories

- Thermostat Guards — see pages 28-29
- Wallplate — F61-2510 for 1F models with adaptor for horizontal or vertical junction box 6¹/₂" W x 4¹/₂" H
- Wallplate — F61-2593 for 1D70, 1E70 models with adaptor for horizontal or vertical junction box 4¹/₂" W x 6¹⁹/₃₂" H



**WHITE-RODGERS 70 SERIES THERMOSTATS
STAGING THERMOSTATS**

Single Stage	Multi-Stage	Heat Pump	Programs		Model	Applications				Thermostat Power Source*	Selectable Performance Features							Comfort and Convenience Features		Terminals	
			Stages Heat/Cool by System	Program Options		Periods Per Day Options	Model Number	Gas / Oil / Electric	3 Wire Zone Valve		Millivolt Compatible	Humidity Control (H)-Humidity / (D)-Dehumidify	Auto Changeover	Programmable Fan	Energy Mgt. Recovery	Energy Star	Keypad Lockout (T)-Total / (P)-Partial	Set-Point Temperature Limits Adjustable Max/Min	Indoor Remote Sensors Max. Number + Thermostat Average and/or Weighted		Outdoor Remote Sensor
	2/2	2/1	∅	∅	1F73-174	✓				H	✓							1.2	✓***	P	R, C, Y, Y2, W/E, W2, G, B/O
		2/1	5+2	4	1F72-151	①				H		✓	✓					1.2	✓***	B	R, C, Y, W2, G, B/O, L, E
		2/1	∅	∅	1F79-111	①				H								1.2	✓***	B	R, C, Y, W2, G, B/O, L, E

SINGLE STAGE THERMOSTATS

Single Stage	Multi-Stage	Heat Pump	Programs		Model	Applications				Thermostat Power Source*	Selectable Performance Features							Comfort and Convenience Features		Terminals			
			Stages Heat/Cool by System	Program Options		Periods Per Day Options	Model Number	Gas / Oil / Electric	3 Wire Zone Valve		Millivolt Compatible	Humidity Control (H)-Humidity / (D)-Dehumidify	Auto Changeover	Programmable Fan	Energy Mgt. Recovery	Energy Star	Keypad Lockout (T)-Total / (P)-Partial	Set-Point Temperature Limits Adjustable Max/Min	Indoor Remote Sensors Max. Number + Thermostat Average and/or Weighted		Outdoor Remote Sensor	Display Size Square inches	Lighted Display
1/1		1/1	7-Day	4	1F78-167	✓	✓			B		✓	✓					1.2	✓	P	RC, RH, W, Y, G, O, B		
1/1		1/1	5+2	4	1F78-151	✓	✓			B		✓	✓					1.2	✓	B	RC, RH, W, Y, G, O, B		
1/1		1/1	5+2	4	1E78-151 Vertical	✓	✓			B		✓	✓					1.2	✓	B	RC, RH, W, Y, G, O, B		
1/1		1/1	5+2	4	1F78H-151	✓				H		✓	✓					1.2	✓	P	RC, RH, C, W, Y, G, O, B		
1/1		1/1	∅	∅	1F78-144	✓	✓			B								1.2	✓	B	RC, RH, W, Y, G, O, B		
1/1		1/1	∅	∅	1E78-144 Vertical	✓	✓			B								1.2	✓	B	RC, RH, W, Y, G, O, B		
1/1		1/1	∅	∅	1F78H-144	✓				H								1.2	✓	P	RC, RH, C, W, Y, G, O, B		
1/∅			∅	∅	1E78-140 Vertical	✓	✓			B								1.2	✓	B	RH, W		
NEW!	1/∅		∅	∅	1D78-140	✓	Temporary Construction Thermostat (Requires 1E78 Subbase or Order F4-1748 Subbase)																RH, W

* H = Hardwired (Requires Common)
B,H = Battery Powered or Hardwired
B = Battery Powered

① Heat Pump for Stage 1, and Gas/Oil/Electric for 2nd Stage/Emergency
*** Optional Continuous Display Light w/Hardwire connection



TECHNICAL HELP

- Single Stage Configuration/Wiring, 1F Models only See pages 189-190
- Single Stage Configuration/Wiring, 1E78 Models only See pages 185
- Multi-Stage Configuration/Wiring, 1F Models only See pages 186-187
- Heat Pump Configuration/Wiring, 1F Models only See pages 188

**Heating & Air Conditioning
1E78**

Non-Programmable Heat Only Thermostat

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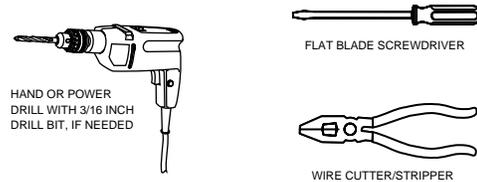
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 Thermostat Details 1
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YOUR THERMOSTAT REPLACES

Typical System Compatibility Chart	1E78
Standard Heat Only Two Wire Gas or Oil Fired Systems (24 volt)	Yes
Electronic Ignition Heat Only Two Wire Systems (24 volt)	Yes
Electronic Ignition Heat Only Gas or Oil Fired Systems (24 volt)	Yes
Standard Heat/Cool Systems (24 volt)	No
Heat/Cool Systems Electric Heat (24 volt)	No
Heat Only Electric Heat Systems (24 volt)	No
Cool Only Systems	No
Heat Pump Systems (No Aux. or Emergency Heat)	No
Hot Water Zone Heat Only (Two Wire) Systems	Yes
Hot Water Zone Heat Only (Three Wire) Systems	No
Line Voltage Heating or Baseboard 110/240 Volt Systems	No
Millivolt Systems Floor or Wall Furnaces	Yes
12 VDC Mobile Home Application	Yes
Multistage Systems	No
Systems Exceeding 30VAC, 1.5 Amp	No

1 PREPARATIONS

Assemble tools required as shown below.



Failure to follow and read all instructions carefully before installing or operating this control could cause personal injury and/or property damage.

2 THERMOSTAT DETAILS

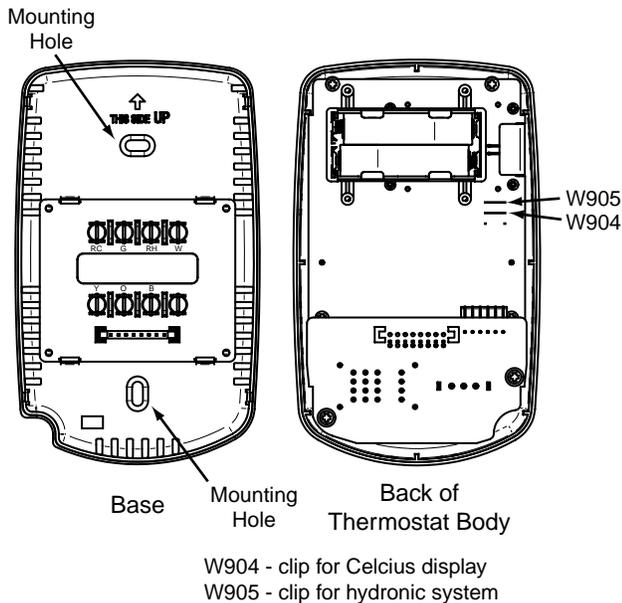


Figure 1. Thermostat

3 REMOVING OLD THERMOSTAT

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.

Before removing wires from old thermostat's switching subbase, **label each wire** with the terminal designation it was removed from.

- Remove Old Thermostat:** A standard heat/cool thermostat consists of three basic parts:
 - The cover, which may be either a snap-on or hinge type.
 - The base, which is removed by loosening all captive screws.
 - The switching subbase, which is removed by unscrewing the mounting screws that hold it on the wall or adaptor plate.
- Shut off electricity at the main fuse box until installation is complete. Ensure that electrical power is disconnected.
- 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.
- Identify each wire attached to the old thermostat using the labels enclosed with the new thermostat.**
- Disconnect the wires from the old thermostat one at a time. **DO NOT LET WIRES FALL BACK INTO THE WALL.**
- Install new thermostat using the following procedures.

3 REMOVING OLD THERMOSTAT *continued from first page*

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 non-absorbent gloves, take up the spilled mercury 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 2895 Harrison Street, Batesville, AR 72501-2117 for proper disposal.

4 MOUNTING AND WIRING

⚠ 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.

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.

The factory default setting is forced air heat. Clipping jumper W905 on the circuit board will produce a longer heating cycle which is normally for hot water or steam (hydronic) systems. Both settings produce a very accurate temperature control and can be set to your personal preference. As received, the thermostat cycles the system just under 1°F. With W905 clipped, the system cycles at approximately 1.5°F.

⚠ CAUTION

Take care when securing and routing wires so they do not short to adjacent terminals or rear of thermostat. Personal injury and/or property damage may occur.

TERMINAL CROSS REFERENCE CHART

New Thermostat Terminal Designation	Other Manufacturers' Terminal Designation
RH	4 RH M
W	W W H

Attach Thermostat Base to Wall

1. Remove the packing material from the thermostat. Gently pull the body straight off the base. Forcing or prying on the thermostat will cause damage to the unit.
2. Connect wires beneath terminal screws on base using appropriate wiring schematic (see fig. 2).
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. 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.
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 "AAA" alkaline batteries to operate.

If "LO BATTERY" appears on the display, the batteries are low and should be replaced with fresh "AAA" Energizer® alkaline batteries. The batteries are located on the back of the thermostat body (see fig. 1).

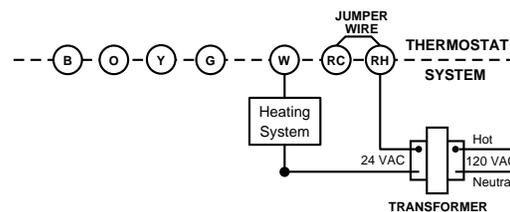


Figure 2. Typical wiring diagram for heat only, 2-wire, single transformer systems

5 CHECK THERMOSTAT OPERATION

NOTE

To prevent static discharge problems, touch side of thermostat to release static build-up before touching any keys.

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

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.

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 body** and the **base**. To remove the body, gently pull it straight out from the base. To replace the body, line up the body with the base and press gently until the body snaps onto the base.

The Thermostat Buttons and Switches

- ① (Up arrow) Raises temperature setting.
- ② (Down arrow) Lowers temperature setting.
- ③ SYSTEM switch (**OFF**, **HEAT**).

The Display

- ④  is displayed when the SYSTEM switch is in the **HEAT** position.
- ⑤ Displays current temperature.
- ⑥ **"LO BATTERY"** is displayed when the 2 "AAA" batteries are low and should be replaced. Nothing else will be displayed.
- ⑦ Displays currently set temperature (this is blank when SYSTEM switch is in the **OFF** position).

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.

- **TEMPERATURE SETTING**—Press  or  until the display shows the temperature you want. The thermostat will keep the room temperature at the selected temperature.
- **°F/°C CONVERTIBILITY**—The factory default setting is Fahrenheit. Clipping W904 jumper on the circuit board (see fig. 1) will alter this feature to Celsius temperature setting.

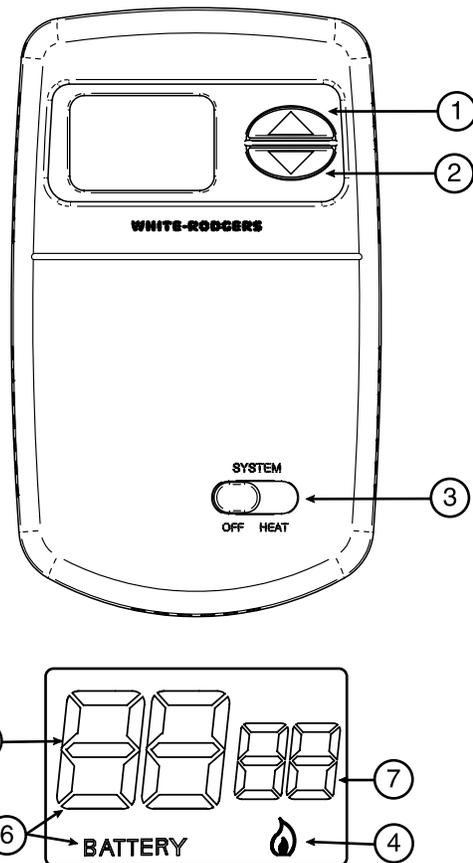


Figure 3. Thermostat display buttons and switches

- **LOW BATTERY INDICATOR**—If the 2 "AAA" alkaline batteries are low and should be replaced, the display will be blank except for **"LO BATTERY"**. When the batteries are low, pressing any button will cause the display to operate for ten seconds. After ten seconds, the display will be blank except for **"LO BATTERY"**. After **"LO BATTERY"** has been displayed for 4 weeks, the thermostat will drop the temperature 10° below your setpoint in **HEAT** mode. You cannot program with low batteries, but you can override setpoint temperature.
- **TEMPERATURE DISPLAY ADJUSTMENT**—Your new thermostat has been accurately set in our factory. However, if you wish, you may adjust your new thermostat temperature display to match your old thermostat. This can be accomplished (within a $\pm 3^\circ$ range) as follows:
 1. Press  and  at the same time for two seconds with the SYSTEM switch in **OFF** position.
 2. Press  or  to adjust the displayed temperature to your desired setting.
 3. Move SYSTEM switch from **OFF** to exit the feature.
- **DISPLAY BACKLIGHT**—The display backlight improves display contrast in low lighting conditions. Selecting backlight ON will turn the light on for a short period of time after any button is pressed. Selecting backlight OFF (default) will keep the light off. Turn the display backlight feature ON as follows:
 1. Press  and  at the same time for two seconds with the SYSTEM switch in **HEAT** position. The display will alternately show **"-L"** AND **"FF" (off)**.
 2. Press  or  to change **"FF"** to **"ON"**.
 3. Move SYSTEM switch to **OFF** to exit the feature.

6 SPECIFICATIONS

ELECTRICAL DATA

Electrical Rating:

0 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: -40°F to 150°F

7 TROUBLESHOOTING

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  at the same time while moving the SYSTEM switch from **OFF** to **HEAT**. This also resets the factory defaults. If the thermostat has power, has been reset

and still does not function correctly contact your heating/cooling service person or place of purchase.

Batteries

For optimum performance, we recommend replacing batteries once a year with fresh “AAA” Energizer® alkaline batteries.

Symptom	Possible Cause	Corrective Action
No Heat (common problems)	<ol style="list-style-type: none"> Blown fuse or tripped circuit breaker. Furnace power switch to OFF. Furnace blower compartment door or panel loose or not properly installed. 	<p>Replace fuse or reset breaker. Turn switch to ON. Replace door panel in proper position to engage safety interlock or door switch.</p>
No Heat	<ol style="list-style-type: none"> Pilot light not lit. SYSTEM Switch not set to HEAT. Loose connection to thermostat or system. Furnace Lock-Out Condition. Heat may also be intermittent. Heating system requires service or thermostat requires replacement. 	<p>Re-light pilot. Set SYSTEM Switch to HEAT and raise temperature above room temperature. Verify thermostat and system wires are securely attached. Many furnaces have safety devices that shut down when a lock-out condition occurs. If the heat works intermittently contact the furnace manufacturer or local service person for assistance. Diagnostic: Set SYSTEM Switch to HEAT and raise the setpoint above room temperature. Within a few seconds the thermostat should make a soft click sound. This sound usually indicates the thermostat is operating properly. If the thermostat does not click, try the reset operation listed above. If the thermostat does not click after being reset contact your heating and cooling service person or place of purchase for a replacement. If the thermostat clicks, contact the furnace manufacturer or a service person to verify the heating is operating correctly.</p>
Heat, Runs Constantly	<ol style="list-style-type: none"> Possible short in wiring. Possible short in thermostat. Possible short in heat system. 	<p>Check each wire connection to verify they are not shorted or touching together. No bare wire should stick out from under terminal screws. Try resetting the thermostat as described above. If the condition persists the manufacturer of your system or service person can instruct you on how to test the Heat system for correct operation. If the system operates correctly, replace the thermostat.</p>
Furnace Cycles Too Fast or Too Slow (narrow or wide temperature swing)	<ol style="list-style-type: none"> The location of the thermostat and/or the size of the Heating System may be influencing the cycle rate. 	<p>Digital thermostats normally provide precise temperature control and may cycle faster than some older mechanical models. A faster cycle rate means the unit turns on and off more frequently but runs for a shorter time so there is no increase in energy use. If you would like to increase the cycle time, clip Jumper W-905 as mentioned in the instructions for Hydronic Heating Systems. It is not possible to shorten the cycle time. If an acceptable cycle rate is not achieved as received or by clipping W-905 contact a local service person for additional suggestions.</p>
Thermostat Setting and Thermostat Thermometer Disagree	<ol style="list-style-type: none"> Thermostat thermometer setting requires adjustment. 	<p>The thermometer can be adjusted +/- 3 degrees. See Temperature Display Adjustment in the Operation section.</p>
Blank Display and/or Keypad Not Responding	<ol style="list-style-type: none"> Voltage spike or static discharge. Battery change required. 	<p>Replace batteries and check heat/cool system for proper operation. If a voltage spike occurs use the Reset Operation listed above.</p>