



80 Series Thermostat with Automatic Heat/Cool Changeover Option

Single Stage or Heat Pump

Installation and Operating Instructions for Model:

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.

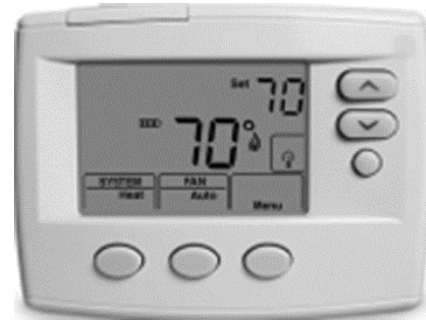
Model	Programming Choices		
1F80-0471	5/2 Day	5/1/1 Day	Non-Programmable
1F86-0471	Non-Programmable		

APPLICATIONS

THERMOSTAT APPLICATION GUIDE

Description	
Gas or Oil Heat	Yes
Electric Furnace	Yes
Heat Pump (No Aux. or Emergency Heat)	Yes
Heat Pump (with Aux. or Emergency Heat)	No
Systems with up to 3 Stages Heat, 2 Stages Cool	No
Heat Only Systems	Yes
Millivolt Heat Only Systems – Floor or Wall Furnaces	Yes
Cool Only Systems	Yes
Hydronic (Hot Water) Zone Heat – 2 Wires	Yes
Hydronic (Hot Water) Zone Heat – 3 Wires	Yes

TDS Thermostat



SPECIFICATIONS

Electrical Rating:	
Battery Power	mV to 30 VAC, NEC Class II, 50/60 Hz or DC
Input-Hardwire	20 to 30 VAC
Terminal Load	1.0 A per terminal, 1.5A maximum all terminals combined
Setpoint Range	45° to 90°F (7° to 32°C)
Differential (Single Stage)	Heat 0.6°F; Cool 1.2°F (adjustable)
Differential (Heat Pump)	Heat 1.2°F; Cool 1.2°F (adjustable)
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 Thermostat	3.4"H x 4.4"W x 1.3"D

⚠ 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.

ATTENTION: MERCURY NOTICE

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

Mercury and products containing mercury must not be discarded in household trash. Do not touch any spilled mercury. Wearing non-absorbent gloves, clean up any spilled mercury and place in a sealed container. For proper disposal of a product containing mercury or a sealed container of spilled mercury, place it in a suitable shipping container and send it to:

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INSTALLATION

⚠ WARNING

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

Remove Old Thermostat

A standard heat/cool thermostat consists of three basic parts:

1. The cover, which may be either a snap-on or hinge type.
2. The base, which is removed by loosening all captive screws.
3. The switching subbase, which is removed by unscrewing the mounting screws that hold it on the wall or adapter plate. **Before removing wires from old thermostat, label each wire with the terminal designation from which it was attached.** Disconnect the wires from the old thermostat one at a time. **Do not let wires fall back into the wall.**

Installing New Thermostat

1. Pull the thermostat body off the thermostat base. Forcing or prying on the thermostat will cause damage to the unit.
2. Place base over hole in wall and mark mounting hole locations on wall using base as a template.
3. Move base out of the way. Drill mounting holes. If you are using existing mounting holes and the holes drilled are too large and do not allow you to tighten base snugly, use plastic screw anchors to secure the base.
4. Fasten base snugly to wall using mounting holes shown in Figure 2 and two mounting screws. Leveling is for appearance only and will not affect thermostat operation.
5. Connect wires to terminal block on 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.
7. Carefully line the thermostat up with the base and snap into place.

SS/HP Switch (Conventional or Heat Pump Selection)

The SS/HP switch is factory set to the SS position. In this position, thermostat is configured as conventional single stage. If you have a single stage heat pump system, switch SS/HP to HP position (see figure 2).

Electric/Gas Switch (Fan Option)

The ELEC/GAS switch is factory set to the GAS position. In this position, the thermostat will not power the circulator fan on a call for heat, but will power the circulator on a call for cool.

If your system requires that the thermostat power the circulator fan on a call for heat, this switch should be set to the ELEC position. Typically, gas and oil heating systems do not require the thermostat to power the circulator fan during a call for heat. If your heat is gas or oil, the switch should be set to the GAS position.

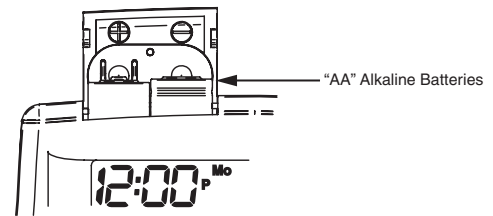
When the thermostat is configured for Heat Pump, the thermostat will always power the circulator fan on a call for heat in the HEAT mode.

Batteries

2 "AA" alkaline batteries are included in the thermostat. To install the batteries, pull the battery door as shown by the arrow and lift open. Using the polarity indicated inside the battery door, insert the batteries. To close the battery door, swing the door down while pulling in the direction of arrow.

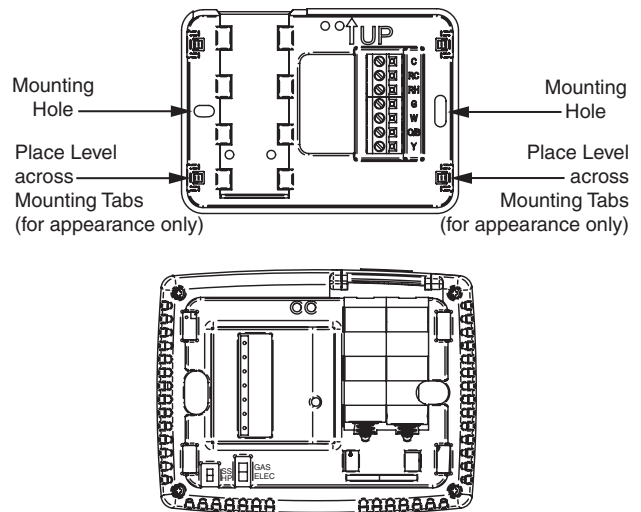
Once fully down, snap the door back into position. To replace the batteries, set system to OFF, following the instructions above.

Figure 1 – Battery door shown open



Thermostat can be powered by system AC power or Battery. If is displayed the thermostat is battery powered. If is not displayed, thermostat is system powered with optional battery back-up. When battery power remaining is approximately half the will be displayed. If the home is going to be unoccupied for an extended period (over 3 months) and is displayed, the batteries should be replaced before leaving. When Change is displayed, install fresh "AA" alkaline batteries immediately. The setpoint temperature will offset by 10 degrees (10 degrees cooler in heat mode / 10 degrees warmer in Cool mode) when less than two months of battery life remain. (If offset occurs the normal setpoint can be manually reset with or , if batteries are not replaced another offset will occur within two days).

Figure 2 – Thermostat base and rear view of thermostat



WIRING CONNECTIONS

Refer to equipment manufacturers' instructions for specific system wiring information. After wiring, see CONFIGURATION section for proper thermostat configuration.

TERMINAL DESIGNATION DESCRIPTIONS

Terminal Designation	Description
O/B	Changeover valve for heat pump
Y	Compressor Relay
W	Heat Relay
G	Fan Relay
RH	Power for Heating
RC	Power for Cooling
C	Common wire from secondary side of cooling system transformer or heat only system transformer

THERMOSTAT QUICK REFERENCE

Home Screen Description

Figure 4 – Home Screen Display

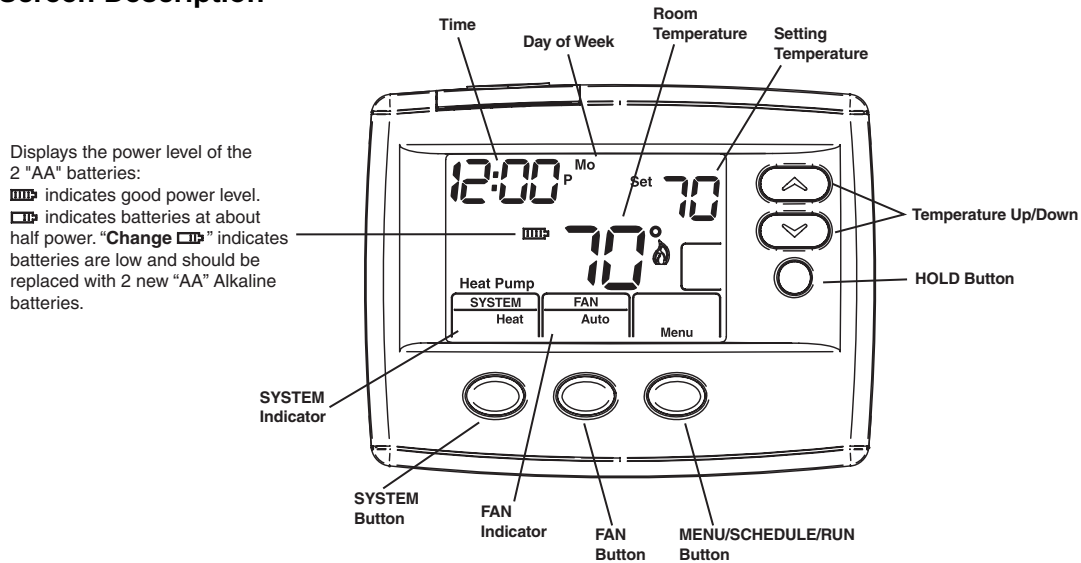
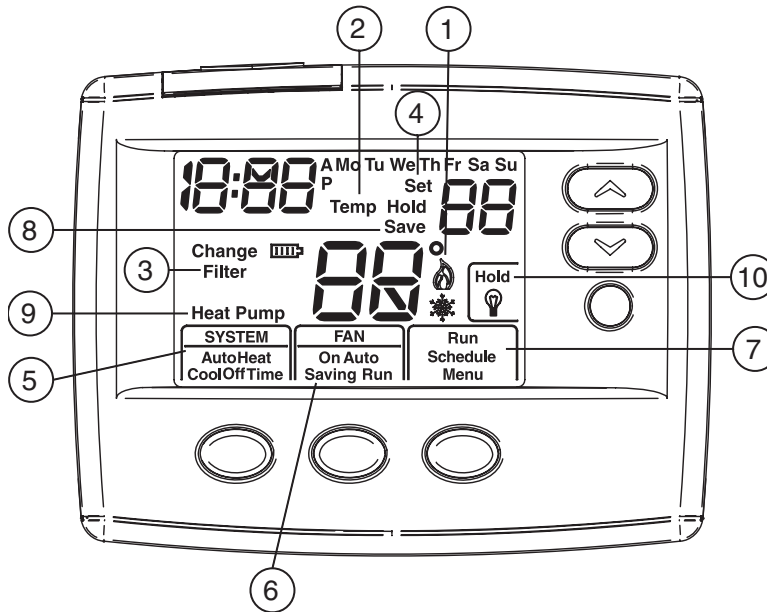




Figure 5 – Programming & Configuration Items







Programming and Configuration Items

- ① Flame icon (🔥) is displayed when the system is in **HEAT** mode. Snowflake icon (❄️) is displayed when the system is in **COOL** mode.
- ② The word **HOLD** is displayed when the thermostat is in the **HOLD** mode. **Temp HOLD** is displayed when the thermostat is in a **Temporary HOLD** mode.
- ③ Displays **Change Filter** when the system has run for the programmed filter time period as a reminder to change or clean your filter.
- ④ Displays **"Set"** for setpoint when in Run Program mode.
- ⑤ Displays **System Mode (Heat, Cool, Auto, Off)** or Time in menu mode.
- ⑥ Displays **Fan Mode (On, Auto)** or **"Run"** in **Menu mode** or **"Saving"** in **Cool Savings™ Mode**.
- ⑦ Displays **"Run Schedule"**, **"Schedule"**, or **"Menu"**.
- ⑧ Displays **"Save"** when **Cool Savings™** is working.
- ⑨ Displays **"Heat Pump"** when system is configured as Heat Pump thermostat.
- ⑩ Displays **"Hold"** in programmable mode when in **"Hold"** mode. Displays **Light Bulb** in non-programmable mode.

INSTALLER/CONFIGURATION MENU







Press the Menu button for at least 5 seconds. The display will show item #1 in the table below. Press Menu to advance to the next menu item. Press  or  to change a menu item.

INSTALLER/CONFIGURATION MENU						
MENU REF.	HP	SS	PRESS BUTTON	DISPLAYED (FACTORY DEFAULT)	Press  or  to select from listed options	COMMENTS
1	1		MENU	On (Cool O)	Heat b On	Reversing Valve Output (Heat Pump switch S8 must be in the Heat Pump HP position)
2	2	1	MENU	P (2)	P 3, P 0	Selectable Programs Per Week (For programmable thermostat only)
3	3	2	MENU	Cool Saving CS (OFF)	Cool Saving CS On	Select Cool Savings on or off
				CS (3)	6, 5, 4, 2, 1	Selects Cool Savings value 1 (low) to 6 (high)
4	4	3	MENU	E (On)	E OFF	Selects Energy Management Recovery (EMR) on or off
5		4	MENU	CR Heat (ME)	FA, SL	Adjustable Anticipation (Heat) (only when heat pump switch is at the SS position)
6		5	MENU	CR Cool (FA)	SL	Adjustable Anticipation (Cool) (only when heat pump switch is at the SS position)
7	5		MENU	CR Heat Pump (FA)	SL	Adjustable Anticipation (Heat Pump) (only when heat pump switch is at the HP position)
8	6	6	MENU	CL (OFF)	CL On	Compressor Lockout Time
9	7	7	MENU	Auto Heat Cool Off	Heat Cool Off, Heat Off with Fan icon, Heat Off without Fan icon, Cool Off, Auto Off	System Mode Configuration with Automatic Changeover
				Cool Off Heat	Heat Off with Fan icon, Heat Off without Fan icon, Cool Off	System Mode Configuration without Automatic Changeover
10	8	8	MENU	L (On)	L OFF	Selects Display Light on or off
11	9	9	MENU	0 HI	1 HI, 2 HI, 3HI, 4 HI, 1 LO, 2 LO, 3 LO, 4 LO	Adjustable Ambient Temperature Display
12	10	10	MENU	F	C	Selects Fahrenheit/Celcius Temperature Display
13	11	11	MENU	Change Filter (OFF)	Change Filter On	Selects Filter Change-out Indicator
				Change Filter 200 h	25 h to 1975 h in 25-hour increment	When on, selects time in 25 hour increments
14	12	12	RUN			Returns to Normal Operation

- Select Reversing Valve Output** (Heat Pump switch S8 must be set at HP) – The O/B option is factory set at "O" position. This will accommodate the majority of heat pump applications, which require the changeover relay to be energized in COOL. If the thermostat you are replacing or the heat pump being installed with this thermostat requires a "B" terminal, to energize the changeover relay in HEAT, the O/B option should be set at "B" position.
- Program Options:** This control can be configured for 5/2 day or 5/1/1 day programming or non-programming mode. The default setting is P2, indicating 5/2 day programming. The programs per week can be toggled to P3 or P0 by pressing the  or  keys. A selection of 0 Days for non-programmable will eliminate the need for EMR, and that step in the menu will be skipped.
- Select Cool Savings™:** With Cool Savings™ enabled, the thermostat will make small adjustments to the setpoint temperature during periods of high demand to reduce AC

system running time and save energy. When the cooling system has been running for more than 20 minutes, humidity in the home will be lower and a higher setpoint temperature will feel comfortable. After 20 minutes of run time, the thermostat will start increasing the setpoint temperature in steps of less than one degree as the system continues to run. These adjustments will eventually cause the system to satisfy the thermostat to turn the system off and reduce the energy consumption. When the Cool Savings™ feature is active and making adjustments, the display will show "Save" next to the setpoint temperature. The amount of the adjustments to the setpoint temperature is dependent on the Cool Savings™ value that is set, 1 being the least adjustment and 6 being the most adjustment. With this feature set to OFF, no change will occur when the AC system is continuously running during the periods of high demand. Periods of high demand will normally occur during the late afternoon and early evening on the hottest days of the summer.

INSTALLER/CONFIGURATION MENU

- 4) **Energy Management Recovery:** (this step is skipped if configured to be non-programmable).
Energy Management Recovery (E) On enables the thermostat to start heating or cooling early to make the building temperature reach the program setpoint at the time you specify. Heating will start 5 minutes early for every 1° of temperature required to reach setpoint.
Example: If E On is selected and have your heating programmed to 65° at night and 70° at 7 AM. If the building temperature is 65°, the difference between 65° and 70° is 5°. Allowing 5 minutes per degree, the thermostat setpoint will change to 70° at 6:35 AM. Cooling allows more time per degree, because it takes longer to reach set temperature.
- 5, 6 & 7) **Cycle Rate Selection** – The factory default setting for Heat is medium cycle (ME), which cycles heat at approximately 0.6°F. If you prefer fast or slow cycle, press the  or  key to change to FA or SL. Heat will cycle at approximately 0.4 or 1.2°F. For Heat Pump and Cool, the default setting is fast (FA CR), which cycles heat and cool at 1.2°F. If you prefer slow cycle, press  or  to change to SL. Cool or heat will cycle at 1.7°F. For Cool the default setting is fast cycle (FA CR), which cycles cool at approximately 1.2°F. If you prefer slow cycle, press the  or  key to change to SL, cool will cycle at approximately 1.7°F.
- 8) **Select Compressor Lockout CL OFF or ON** – Selecting CL ON will cause the thermostat to wait 5 minutes 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 lockout feature is already present in their system. When the thermostat compressor time delay occurs, it will flash the setpoint for up to five minutes.
- 9) **System Mode Configuration** – This thermostat is configured for Heat and Cool with Auto changeover (SYSTEM switch with Cool Off Heat Auto) default. It can also be configured for Heat and Cool (Cool Off Heat), Heat only with fan (Off Heat), Heat only without fan, Auto only (Auto Off), and Cool only (Cool Off).
- 10) **Select Backlight Display** – The display backlight improves display contrast in low lighting conditions. When the "C" terminal is powered, selecting backlight CdL ON will keep the light on continuously. Select backlight OFF will keep the light on momentarily after any key is pressed. When the "C" terminal is not powered, the light will be on momentarily after any key is pressed no matter whether the backlight is selected ON or OFF.
- 11) **Select Temperature Display Adjustment 4 LO to 4 HI** Allows you to adjust the room temperature display up to 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. The current or adjusted room temperature will be displayed on the left side of the display.
- 12) **Select F° or C° Readout** – Changes the display readout to Centigrade or Fahrenheit as required.
- 13) **Select Filter Replacement Run Time** – The thermostat will display "Change Filter" after a set time of blower operation. This is a reminder to change or clean your air filter. This time can be set from 25 to 1975 hours in 25 hour increments. A selection of OFF will cancel this feature. When "Change Filter" is displayed, you can clear it by pressing Menu button. In a typical application, 200 hours of run time is approximately 30 days.

OPERATING YOUR THERMOSTAT ————— IMPORTANT! —————

Choose the Fan Setting (Auto or On)

Set the FAN Switch to **Auto** or **On**.

Fan **Auto** is the most commonly selected setting and runs the fan only when the heating or cooling system is on.

Fan **On** runs the fan continuously for increased air circulation or to allow additional air cleaning.

Choose the System Setting (Heat, Off, Cool, Auto)

Press the SYSTEM button to select:



Heat: Thermostat controls only the heating system.

Off: Heating and Cooling systems are off.



Cool: Thermostat controls only the cooling system.

Auto: Auto Changeover is used in areas where both heating and cooling may be required on the same day. **AUTO** allows the thermostat to automatically select heating or cooling depending on the indoor temperature and the selected heat and cool temperatures. When using **AUTO**, be sure to set the Cooling temperatures more than 1° Fahrenheit higher than the heating temperature.





Manual Operation for Non-Programmable Thermostats (1F86 or 1F80)

Press the SYSTEM button to select Heat or Cool and use the  or  buttons to adjust the temperature to your desired setting. After selecting your desired settings you can also press the SYSTEM button to select **AUTO** to allow the thermostat to automatically change between Heat and Cool.

Manual Operation (Bypassing the Program) Programmable Thermostats







Press  or  and the HOLD button and adjust the temperature wherever you like. This will override the program. The **HOLD** feature bypasses the program and allows you to adjust the temperature manually, as needed. Whatever temperature you set in **HOLD** will be maintained 24 hours a day, until you manually change the temperature or press **Run Schedule** to cancel **HOLD** and resume the programmed schedule.

Program Override (Temporary Override)





Press  or  buttons to adjust the temperature. This will override the temperature setting until the next programmed time. To cancel the temporary setting at any time and return to the program, press **Run Schedule**. If the SYSTEM button is pressed to select **AUTO** the thermostat will change to Heat or Cool, whichever ran last. If it switches to heat but you want cool, or it changes to cool but you want heat, press both  and  buttons simultaneously to change to the other mode.

PROGRAMMING (For Programmable Model Only) —————

Set Current Time and Day

- 1) Press Menu and then Time button once. The display will show the hour only.
- 2) Press and hold either the  or  key until you reach the correct hour and AM/PM designation (AM begins at midnight, PM begins at noon).
- 3) Press Time once again. The display window will show the minutes only.
- 4) Press and hold either the  or  key until you reach the correct minutes.
- 5) Press Time once again. The display will show the day of the week.
- 6) Press the  or  key until you reach the current day of the week.
- 7) Press Run to exit the Time mode.

Enter the Heating Program

- 1) Press SYSTEM button to select "Heat" in the system switch area indicating the active mode being programmed.
- 2) Press the Menu button for at least 5 seconds and then press Schedule.
- 3) The top of the display will show the day(s) being programmed. The time and temperature (flashing) are also displayed. "1" will also be displayed to indicate the period.
- 4) Press  or  key to change the temperature to your selected temperature for the 1st heating period.
- 5) Press Time button, time will flash.
- 6) Press  or  key to adjust the start time for the 1st period.
- 7) The time will change in 15 minute increments.
- 8) After you have set the time and the temperature for the period to begin, press Schedule to advance to the next program period.
- 9) Repeat steps 2 through 8 until all of the program times and temperatures are set for all program periods on that day.
- 10) Press Schedule to the next day and repeat steps 2 through 9.
- 11) When programming is complete and all of the times and temperatures match your desired heating schedule, press Run Schedule. The thermostat will now run your program.

Enter the Cooling Program

- 1) Press SYSTEM button to select "Cool" in the system switch area indicating the active mode being programmed.
- 2) Follow **Enter Heating Program** instructions for entering cooling times and temperatures.

TROUBLESHOOTING

Reset Operation

Note: When thermostat is reset, installer configuration menu settings and programming will reset to factory settings.

If a voltage spike or static discharge blanks out the display or causes erratic thermostat operation, you can reset the thermostat by removing the wires from terminals **R** and **C** (do not short them together) and removing batteries for 2 minutes. After resetting the thermostat, replace the wires and batteries. If the thermostat has been reset and still does not function correctly contact your heating/cooling service person or place of purchase.

Note: Be sure to review the installer configuration menu settings.

To reset the programming, clock and configuration settings, press  and  and the FAN button simultaneously. The thermostat should go blank and then all segments will be displayed momentarily.

Symptom	Possible Cause	Corrective Action
No Heat/No Cool/No Fan (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. Loose connection to thermostat or system. 	<p>Replace fuse or reset breaker. Turn switch to ON. Replace door panel in proper position to engage safety interlock or door switch. Tighten connections.</p>
No Heat	<ol style="list-style-type: none"> Pilot light not lit. Furnace Lock-Out Condition. Heat may also be intermittent. Heating system requires service or thermostat requires replacement. 	<p>Re-light pilot. 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 HVAC 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 HVAC service person to verify the heating is operating correctly.</p>
No Cool	<ol style="list-style-type: none"> Cooling system requires service or thermostat requires replacement. 	<p>Same as diagnostic for No Heat condition except set the thermostat to COOL and lower the setpoint below the room temperature. There may be up to a five minute delay before the thermostat clicks in Cooling.</p>
Heat, Cool or Fan Runs Constantly	<ol style="list-style-type: none"> Possible short in wiring. Possible short in thermostat. Possible short in heat/cool/fan system. FAN Switch set to Fan ON. 	<p>Check each wire connection to verify they are not shorted or touching together. No bare wire should stick out from under terminal block. 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/Cool system for correct operation. If the system operates correctly, replace the thermostat.</p>
Thermostat Setting & Thermostat Thermometer Disagree	<ol style="list-style-type: none"> Thermostat thermometer setting requires adjustment. 	<p>The thermometer can be adjusted +/- 4 degrees. See Temperature Display Adjustment in the Configuration Menu section.</p>
Furnace (Air Conditioner) 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 provide precise control and cycle faster than older mechanical models. The system turns on and off more frequently but runs for a shorter time so there is no increase in energy use. If you would like an increased cycle time, choose SL for slow cycle in the Configuration menu, step 6 (heat), 7 (cool) or 8 (heat pump). If an acceptable cycle rate is not achieved, contact a local HVAC service person for additional suggestions.</p>

