

**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
1F89-0211	Non-Programmable

## APPLICATIONS

### THERMOSTAT APPLICATION GUIDE

Thermostat Configuration Options	Thermostat Applications	Maximum Stages Heat/Cool
Heat Pump Single Stage Compressor	Single Stage Compressor Heat Pump Systems – 1 Stage Aux/Emergency Heat	2/1

1F89-0211 Thermostat



## SPECIFICATIONS

Electrical Rating:

Battery Power or Hardwire .....	20 to 30 VAC, 50/60 Hz
Terminal Load .....	1.5 A per terminal, 2.5A maximum all terminals combined
Setpoint Range .....	45° to 90°F (7° to 32°C)
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 .....	-40° to +150°F (-40° to +65°C)
Dimensions Thermostat .....	3-3/4"H x 4-3/4"W x 1-1/2"D

## PRECAUTIONS

### ⚠ WARNING

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

Thermostat installation and all components of the system shall conform to Class II (current limited) circuits per the NEC code. Failure to do so could cause a fire hazard.

### ⚠ 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.

Index	Page
Installation	2
Wiring Diagram	3
Thermostat Quick Reference	3
Installer Configuration Menu	4
Operation	5
Troubleshooting	6

# 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: 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. Refer to [www.thermostat-recycle.org](http://www.thermostat-recycle.org) for location to send product containing mercury.

## 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.
2. Place base over hole in wall and mark mounting hole locations on wall using base as a template (see Fig. 1).
3. Move base out of the way. Drill mounting holes.
4. Push wires through opening in thermostat base.
5. Fasten base loosely to wall 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.
6. Connect wires to terminals on base using appropriate wiring schematic (see figs. 2 through 4).
7. Push excess wire into wall and plug hole with a fire-resistant material (such as fiberglass insulation) to prevent drafts from affecting thermostat operation.

## O/B TERMINAL SWITCH SELECTION

The O/B switch on this thermostat is factory set to the “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 switch must be moved to the “B” position.

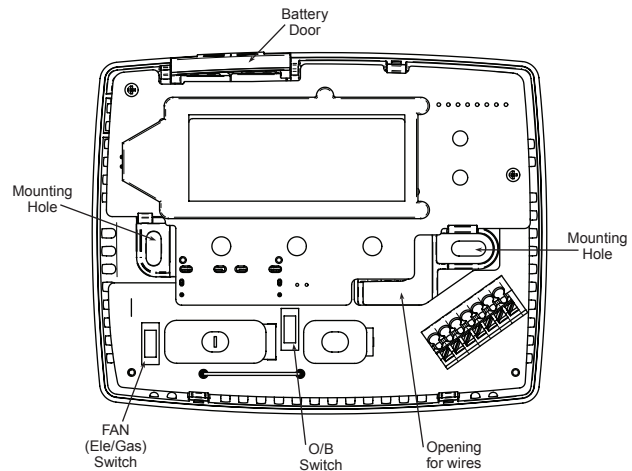
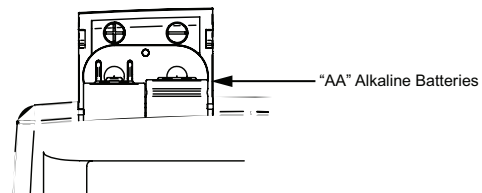


Figure 1. Thermostat Base

## FAN (ELE/GAS) SWITCH

For Electric Heat, heat pump or any system that requires the thermostat to turn on the blower on a call for heat— place the FAN (Ele/Gas) switch (Fig. 1) in the **ON** position. For Auxiliary and Emergency Heat systems that have a fan control to turn on the blower (independent of the thermostat) place switch in the **OFF** position.

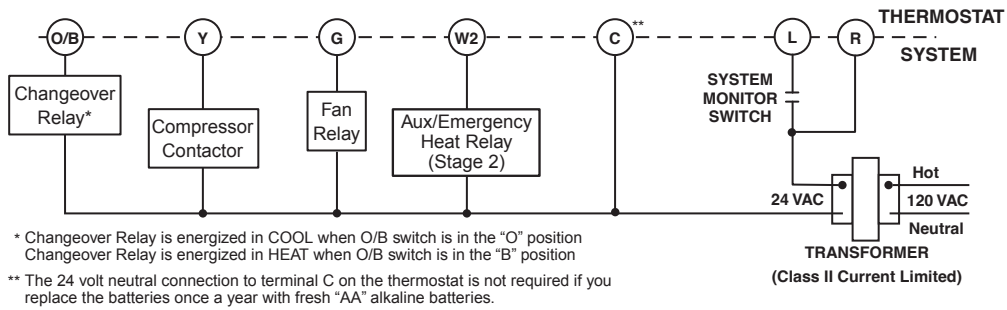
## BATTERY LOCATION



Two “AA” alkaline batteries are installed in your thermostat with a battery tag to prevent power drainage. Prior to use, open the battery door and remove the battery tag. To open, pull the battery door as shown by the arrow and lift open. The two “AA” batteries will operate all functions or maintain time and continuously display the temperature during a loss of AC power. Installed batteries will also allow programming prior to installation. To replace batteries, pull the battery door 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.

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. When “Change ” is displayed, install fresh “AA” alkaline batteries immediately. For best results, use new premium brand alkaline batteries such as Duracell® or Energizer®. We recommend replacing batteries every 2 years. 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 less than two months of battery life remain, the setpoint temperature will offset by 10 degrees (10 degrees cooler in Heat mode / 10 degrees warmer in Cool mode). If offset occurs, the normal setpoint can be manually reset with or . Another offset will occur within two days if batteries are not replaced. To replace the batteries, set system to OFF.


## WIRING DIAGRAM \_\_\_\_\_



**Figure 2. Typical wiring diagram for single transformer systems**

## THERMOSTAT QUICK REFERENCE

Before you begin programming your thermostat, you should be familiar with its features and with the display and the location and operation of the thermostat buttons and switches (see fig. 3). 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.

- ⑪ **“EMER”** is displayed flashing when the system switch is in EMER position.
- ⑫ **“Change Filter”** is displayed when the system has run for the programmed filter time period as a reminder to change or clean your air filter.
- ⑬ **“”** indicates when batteries are low and should be replaced.

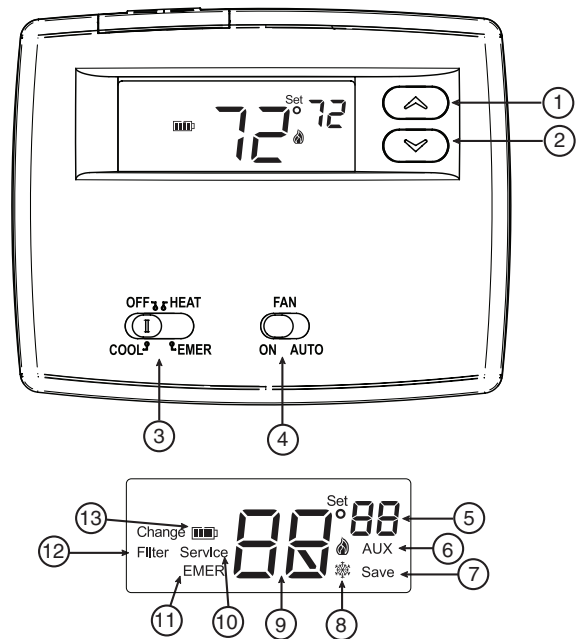
## The Thermostat Buttons and Switches

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







## The Display

- ⑤ Indicates setpoint temperature. This is blank when system switch is in the OFF position. Setpoint temperature is displayed (flashing) if the thermostat is in lockout mode to prevent the compressor from cycling too quickly.
- ⑥ “**AUX**” indicates auxiliary stage is operating.
- ⑦ “**Save**” indicates the Cool Savings feature is enabled in the configuration menu. “**Save**” (flashing) indicates Cool Savings feature is active.
- ⑧ **Flame icon** (Δ) is displayed when the SYSTEM switch is in the HEAT position. **Flame icon** (Δ) is displayed flashing when thermostat is calling for heat. **Snowflake icon** (❄) is displayed (non-flashing) when the SYSTEM switch is in the COOL position. **Snowflake icon** (❄) is displayed (flashing) if the thermostat is calling for cool.
- ⑨ Displays current temperature.
- ⑩ “**Service**” indicates a diagnostic fault in the heating/cooling system. It does not indicate a fault in the thermostat.

**Figure 3. Thermostat display, buttons and switches**





## INSTALLER/CONFIGURATION MENU

The configuration menu allows you to set certain thermostat operating characteristics to your system or personal requirements. To enter the menu: Set your thermostat switch to OFF. Press and hold the  and  buttons simultaneously for approximately 5 seconds. The display will change to show the first item in the configuration menu. Press the  or  button to change the setting. Press the  and  buttons simultaneously again to change to the next menu item. Continue through all steps to accept your new settings. To exit the menu set the system switch to **COOL, HEAT** or **EMER**. If no keys are pressed within fifteen minutes, the thermostat will revert to normal operation.

**1) Select CS (Cool Savings™)** - With Cool Savings™ enabled, the thermostat will make small adjustments to the Setpoint temperature during periods of high demand to reduce cooling 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 and turn the system off to reduce the energy consumption. When the Cool Savings feature is active and making adjustments, the display will show "Save". 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 cooling 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.



























**2 & 3) Select Cycle Rate Selection** - The factory default setting is (FA, CR) for all modes (Heat Pump, Heat Pump Aux, Heat and Cool). To change to slow cycling (SL, CR), press the  or  keys to toggle between FA & SL.

The cycle rate differentials for different settings are:






MODE	Fast	Slow
	FA	SL
Heat Pump	1.2°F	1.7°F
HP Aux	0.8°F	1.2°F

**4) 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.

Configuration Menu

Menu Reference Number	Press Key	Displayed (Factory Default)	Press  or  to select from listed options	Comments
1	 and 	CS (OFF)	On	Select Cool Savings Feature On or OFF
	 and 	CS (3)	1, 2, 3, 4, 5, 6	If CS selected On, selects Cool Savings value
2	 and 	CR HE-PU (FA)	SL	Select Adjustable Anticipation, cycle rate, Heat Pump, Heat and Cool
3	 and 	CR Aux (FA)	SL	Select Adjustable Anticipation, cycle rate, Heat Pump Aux Stage
4	 and 	CL (OFF)	On	Select Compressor lockout OFF or On
5	 and 	L (On)	OFF	Select Display Light On or OFF
6	 and 	Temp (0 HI)	4 LO to 4 HI	Select temperature display adjustment higher or lower
7	 and 	°F	°C	Select °F / °C Display (temperature units in Fahrenheit or Celsius)
8	 and 	FH (On)	OFF	Select fast second stage On or OFF
9	 and 	Change Filter (OFF)	On	Select filter replacement indicator OFF or On
	 and 	Change Filter (200 h)	25 to 1975	If Change Filter selected On, selects time interval for Change Filter Indicator. (in 25 hour increments)
10	 and 			Returns to normal operation

## INSTALLER/CONFIGURATION MENU

- 5) **Select Backlight Display** - The display backlight improves display contrast in low lighting conditions. When the "C" terminal is connected, selecting backlight CdL On will keep the light on continuously. Select backlight OFF will turn the light on momentarily when any key is pressed. When the "C" terminal is not connected, regardless of the backlight selection, the light will be on momentarily when any key is pressed.
- 6) **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 display.
- 7) **Select F° or C° Readout** - Changes the display readout to Celsius or Fahrenheit as required.
- 8) **Select Fast Second Stage ON or OFF** - (Heat Pump Only)  
In the HEAT mode, with the Fast Heat feature enabled (FH Heat On), if the temperature is manually raised by 3°F (2°C) or more above the actual temperature using the , the second stage will energize immediately. With FH OFF, the thermostat will determine the optimum time (approximately 0 to 30 minutes) to use Auxiliary/Second stage heat in addition to the Heat Pump.
- 9) **Select Filter Replacement Reminder and Set Run Time**  
Select the "Change Filter" reminder On or OFF. If selected On, press  and  to select the time period from 25 to 1975 hours in 25 hour increments. In a typical application, 200 hours (default) of run time is approximately 30 days. After the selected time of blower operation, the thermostat will display "Change Filter" as a reminder to change or clean your air filter. When "Change Filter" is displayed, press the  and  button to clear the display and restart the time to the next filter change. A selection of OFF will cancel this feature.

## OPERATION

### 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.

### Heating System

1. Move SYSTEM switch to **HEAT** position. If the auxiliary heating system has a standing pilot, be sure to light it.
2. Press  to adjust thermostat setting to 1° above room temperature. The **Flame icon** (Δ) will begin to flash and the Heat Pump system should begin to operate. However, if the setpoint temperature is flashing, the compressor lockout feature is operating (see Configuration menu, item 6).
3. Adjust temperature setting to 4° above room temperature. The auxiliary heat system should begin to operate and the **Aux** icon will be flashing.
4. Press  to adjust temperature setting below room temperature. The heating system should stop operating.

### Emergency System



EMER bypasses the Heat Pump to use the heat source wired to terminal **W2** on the thermostat. EMER is typically used when compressor operation is not desired, or you prefer back-up heat only.

1. Move SYSTEM switch to EMER position, EMER will flash on the display.
2. Press  to adjust the thermostat above room temperature. The Aux heating system will begin to operate. The **Flame icon** (Δ) will display flashing to indicate that the Aux system is operating.
3. Press  to adjust the thermostat below room temperature. The Aux 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.



#### CAUTION

Do not allow the compressor to run unless the compressor oil heaters have been operational for 6 hours and the system has not been operational for at least 5 minutes.



# TROUBLESHOOTING

## Reset Operation

If a voltage spike or static discharge blanks out the display or causes erratic thermostat operation, you may need to reset the thermostat. To reset, the System Switch must be in **Cool**, **HEAT**, or **EMER**. Simultaneously hold the  and  buttons

for approximately 10 seconds until the display goes blank. If the thermostat has power, has been reset and still does not function correctly contact your heating/cooling service person or place of purchase.

Symptom	Possible Cause	Corrective Action
<b>No Heat/No Cool/No Fan (common problems)</b>	<ol style="list-style-type: none"> <li>1. Blown fuse or tripped circuit breaker.</li> <li>2. Furnace power switch to OFF.</li> <li>3. Furnace blower compartment door or panel loose or not properly installed.</li> </ol>	Replace fuse or reset breaker. Turn switch to ON. Replace door panel in proper position to engage safety interlock or door switch.
<b>No Heat</b>	<ol style="list-style-type: none"> <li>1. System Switch not set to Heat.</li> <li>2. Loose connection to thermostat or system</li> <li>3. Heating System requires service or thermostat requires replacement.</li> </ol>	Set System Switch to Heat and raise setpoint above room temperature. Verify thermostat and system wires are securely attached.  Diagnostic: Set System Switch to Heat and raise the setpoint above room temperature. Within a five minutes 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 system is operating correctly.
<b>No Cool</b>	<ol style="list-style-type: none"> <li>1. System Switch not set to Cool.</li> <li>2. Loose connection to thermostat or system.</li> <li>3. Cooling System requires service or thermostat requires replacement</li> </ol>	Set System Switch to Cool and lower setpoint below room temperature. Verify thermostat and system wires are securely attached. Same procedure 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 if the compressor lock-out option is selected in the configuration menu (Item 4).
<b>Heat, Cool or Fan Runs Constantly</b>	<ol style="list-style-type: none"> <li>1. Possible short in wiring.</li> <li>2. Possible short in thermostat.</li> <li>3. Possible short in Heat/Cool/Fan system.</li> <li>4. Fan Switch set to Fan On.</li> </ol>	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 below. 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.
<b>Furnace Cycles Too Fast or Too Slow (narrow or wide temperature swing)</b>	<ol style="list-style-type: none"> <li>1. The location of the thermostat and/or the size of the Heating System may be influencing the cycle rate.</li> </ol>	Item 2 in the Configuration Menu is the adjustment that controls the cycle rate. If an acceptable cycle rate is not achieved using the FA (Fast) or SL (Slow) adjustment contact a local service person for additional suggestions.
<b>Cooling Cycles Too Fast or Too Slow (narrow or wide temperature swing)</b>	<ol style="list-style-type: none"> <li>1. The location of the thermostat and/or the size of the Cooling System may be influencing the cycle rate.</li> </ol>	The cycle rate for cooling is fixed and can not be adjusted. Contact a local service person for suggestions.
<b>Thermostat Setting and Thermometer Disagree</b>	<ol style="list-style-type: none"> <li>1. Thermostat thermometer setting requires adjustment.</li> </ol>	The thermometer can be adjusted +/- 4 degrees as listed in item 5 of the Configuration Menu. No other adjustment is possible.
<b>Blank Display and/or Keypad Not Responding</b>	<ol style="list-style-type: none"> <li>1. Voltage Spike or Static Discharge.</li> </ol>	If a voltage spike or static discharge occurs use the Reset Operation listed above.
<b>Thermostat has HP/SS switch and Configuration Menu has selection for HP or SS</b>	<ol style="list-style-type: none"> <li>1. Earlier version of thermostat model.</li> </ol>	If switch is present, it must be in HP position for proper fan operation. If selection appears in Configuration Menu, it must be set for HP.

### STAGING

#### Second Stage - Auxiliary Heat

Most heat pump systems have an Auxiliary or Second Stage electric heater or gas furnace. Heat produced by a heat pump is economical but may not always have the capacity to maintain a comfortable room temperature setting. Auxiliary/Second Stage heat is usually less economical but the added heat capacity assures the system can provide enough heat to satisfy the thermostat setting. Digital thermostats have a built-in function that computes the optimum time (approximately 0-30 minutes) to use Auxiliary / Second Stage heat in addition to the Heat Pump heat.

#### Typical operation:

In moderate weather with a low temperature setting (low demand) the thermostat may use only the heat pump to maintain temperature.

In colder weather or higher temperature settings (higher demand) Auxiliary Heat is used occasionally to supplement the heat pump.

In very cold weather (very high demand) when Heat Pump performance is low Auxiliary Heat is used frequently to maintain comfort.

The thermostat automatically adjusts to optimize comfort and economy using the lowest stage practical to make setpoint. The key to reducing energy costs and minimizing Auxiliary or Second Stage is to set the thermostat to the lowest comfortable heating temperature.

Homeowner Help Line: 1-800-284-2925