



**RETAIN THESE INSTRUCTIONS
 FOR FUTURE REFERENCE**

51M37 Merit® Series Thermostat

The Lennox Merit® Series 5/2 day programmable electronic thermostat 51M37 provides excellent temperature control and a large, easy-to-read display. It includes a programmable filter change reminder, an equipment maintenance reminder, and a system check indicator to notify the user when the equipment requires service.

The 51M37 is suitable for heat pump, 3-stage heat/2-stage cool applications using a gas or electric auxiliary heat source. An optional outdoor temperature sensor provides auxiliary heat lockout, balance point operation, and dual-fuel compatibility.

General

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

Introduction

This document describes the operation of Lennox thermostat 51M37. Refer to the installation manual for instructions regarding installation and wiring of the thermostat.

Initial Thermostat Power-up

When power is initially applied to the thermostat, the display will appear as shown in figure 1.

OPERATION MANUAL

51M37 Merit® Series

5/2 Day Programmable Thermostat

CONTROLS
 505,050M
 05/05
 Supersedes 03/05

TP Technical
 Publications
 Litho U.S.A.

Table of Contents

51M37 Series Thermostat	1
General	1
Introduction	1
Initial Thermostat Power-up	1
Buttons, Backlight, Timers & Settings	2
DAY/TIME - Set Day and Time	2
HEAT - Heat Mode	3
COOL - Cool Mode	4
HOLD - Temperature Hold Mode	5
PROG - Thermostat Programming	5
FAN - Controlling Fan Operation	6
SETTINGS - Filter and Maintenance Reminders ...	6
SETTINGS - Balance Point	7
Service Indicator	7
Thermostat RESET	7
Removing/Installing Thermostat	7
Default Thermostat Settings	7
Technical Specifications	8
Thermostat Output Table	10

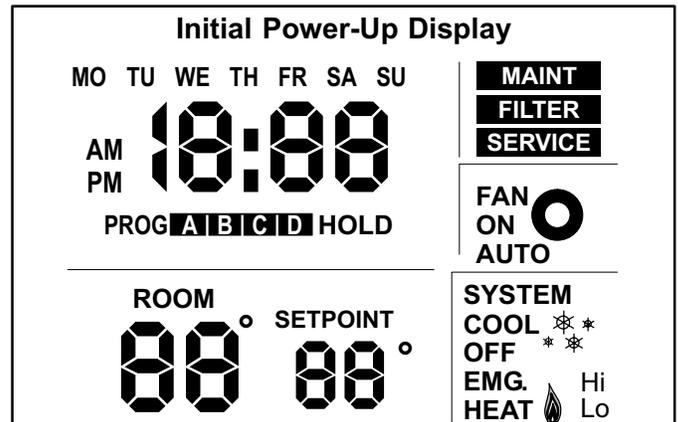


Figure 1

All display segments are momentarily activated. This occurs as a normal part of thermostat initialization.



Within a few seconds, the Home Screen appears (see figure 2) with default settings as shown. After about 1 minute of initialization time, the actual room temperature will be displayed.

NOTE - Tables 2 and 3 on page 8 show all system and programming defaults.

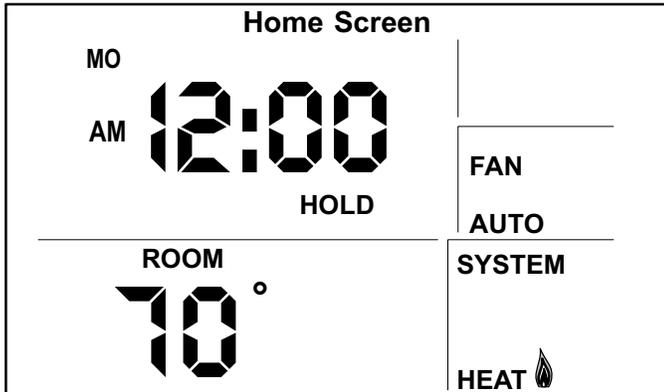


Figure 2

At this point, the thermostat will be fully functional; its default temperature setpoint (not shown) is 70°F. At this point, if the equipment has been fully powered and if a heat demand were present, the system would begin operating.

NOTE - Temperature scale default is Fahrenheit units but may be reset to show Celsius, if desired. See page 8.

Buttons, Backlight, Timers & Settings

Buttons are located behind the small door on the right-hand side of the thermostat (see figure 3).

⚠ IMPORTANT

Do NOT begin pressing buttons until after you read the following section describing each button.

A pale blue display backlight illuminates for 30 seconds each time any button is pressed.

When PROG or DAY/TIME is pressed, a field begins flashing, expecting another input. Start making changes within 15 seconds or the HOME screen will return.

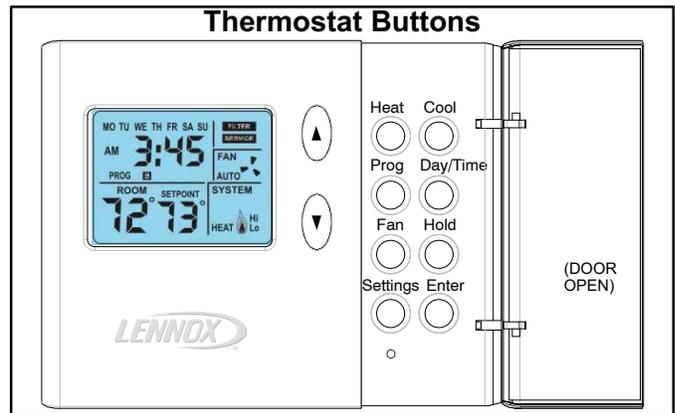


Figure 3

When an Arrow, HOLD, HEAT, or COOL button is pressed, SETPOINT and the temperature setting appears for 15 seconds. If desired, start making changes within 15 seconds or the HOME screen will return. The backlight will turn off 15 seconds after the HOME screen reappears.

DAY/TIME - Setting the Day and Time

Press the DAY/TIME button and set the CURRENT hour, minute, and day of week as follows:

1. "AM12" will flash on the screen. Press the Up/Down arrows buttons to change the hour. ("AM" or "PM" must correspond to time of day.) Press DAY/TIME **OR**, if adjusting for daylight savings time, pressing ENTER stores the single change and exits to the HOME screen, bypassing minutes and day of week.
2. Minutes will flash. Use the Up/Down arrow buttons to display the minutes past the hour. Press DAY/TIME.
3. Day "MO" (Monday) will flash. Use Up/Down arrow buttons to display the current day. Day selections are abbreviated as "MO", "TU", "WE", "TH", "FR", "SA", and "SU". Press DAY/TIME.
4. The HOME screen reappears; confirm day and time are correct. This completes day and time setting.

HEAT - Using the Heat Mode

Normal Heat Mode

In normal heat mode, both the heat pump and the backup heat source are used to provide heat. If the thermostat detects that the heat pump is not able to provide enough heat (as may be the case in very cold weather), then the backup heat source is activated.

Emergency Heat Mode

In emergency heat mode, only the backup heat source provides heat—the heat pump is disabled. The backup heat source is activated only when there is a heat demand.

Enabling Normal Heat Mode

Use the HEAT button to select normal heat mode, emergency heat mode, or to disable heat modes as desired. If the thermostat is in OFF or COOL mode, pressing the Heat button enables Heat mode. This is indicated by HEAT in the SYSTEM box as shown in figure 4.

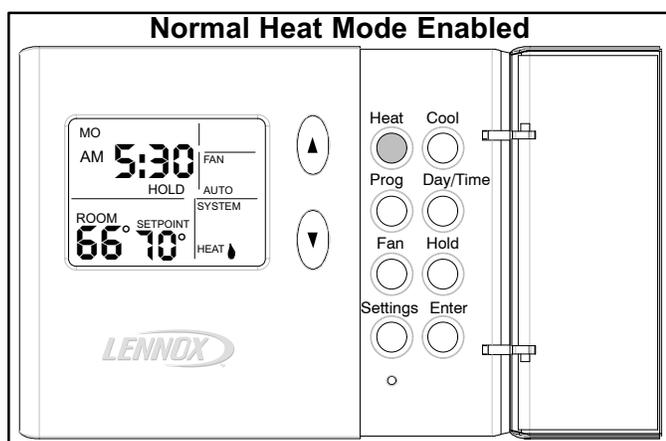


Figure 4

Enabling Emergency Heat Mode

If the thermostat is in heat mode, pressing the Heat button enables EMG. HEAT mode (see figure 5). If the thermostat is in normal heat mode when the HEAT button is pressed, then emergency heat mode is enabled.

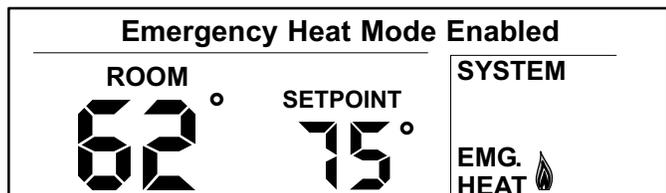


Figure 5

Disabling Heat Mode

If the thermostat is in emergency heat mode when the HEAT button is pressed, then heat modes are disabled. This is indicated by OFF in the SYSTEM box as shown in figure 6.

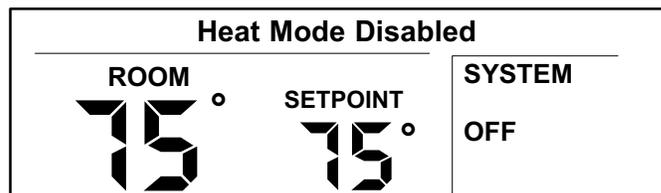


Figure 6

Heating Demand

The thermostat must be in either normal or emergency heat mode in order to properly control the heating equipment. In either heat mode, when the actual temperature is lower than the temperature setpoint (as shown in figure 7), the thermostat detects a heating demand and activates the heating equipment to satisfy the demand. Heating operation is indicated by a flame icon in the SYSTEM box.

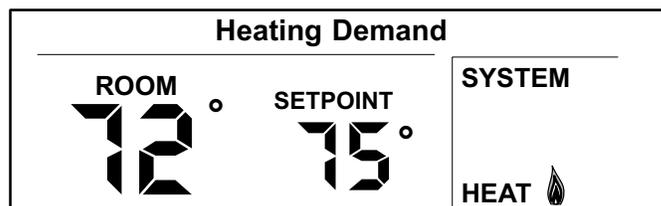


Figure 7

When the actual temperature rises above the temperature setpoint, the flame icon will disappear. This indicates that the heating demand has been satisfied and that the heating equipment has been turned off.

Heat pump operation is locked out for 5 minutes after a demand has been satisfied. If another heat pump demand occurs during this 5-minute interval, the flame icon will flash; however, the heat pump will not run until the 5-minute delay has elapsed.

NOTE - The heat pump is activated for at least 4 minutes if no buttons are pressed during the demand interval. The backup heat source is activated for at least 3 minutes if no buttons are pressed during the demand interval.

If your system supports 3-stage heating (as does the 51M37 thermostat), you may notice various heating levels being delivered during a demand.

If a small heat pump heating demand is present, "Lo" is displayed in the SYSTEM box; if a large heat pump heating demand is present, "Hi" is displayed (see figure 8).

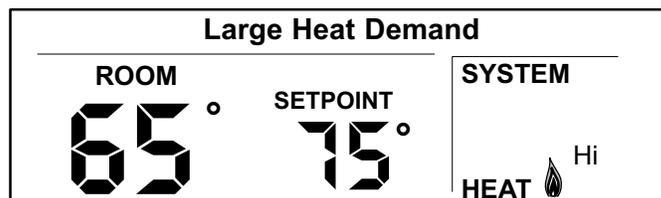


Figure 8

COOL - Using the Cool Mode

Enabling and Disabling Cool Mode

Use the COOL button to enable or disable cool mode as desired. If the thermostat is in HEAT or OFF mode, cool mode is enabled when the COOL button is pressed. This is indicated by COOL in the SYSTEM box (see figure 9).

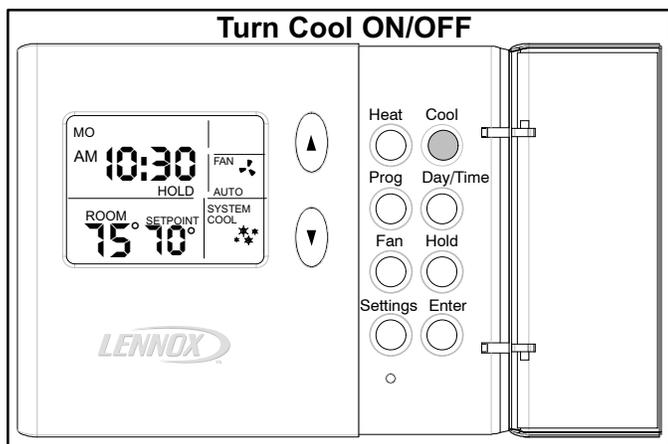


Figure 9

If the thermostat is in cool mode, pressing the Cool button disables COOL mode (indicated by OFF in the SYSTEM box - see figure 10).

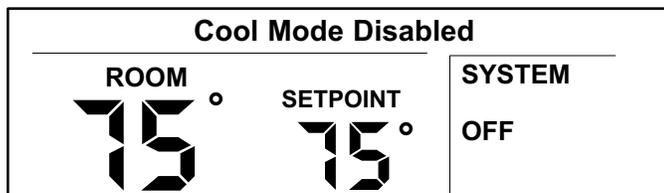


Figure 10

Cooling Demand

Set the thermostat to cool mode to control the cooling equipment. Then, if the room temperature is higher than the temperature setpoint, as shown in figure 11, the thermostat detects a cooling demand and will activate the cooling equipment to satisfy the demand.

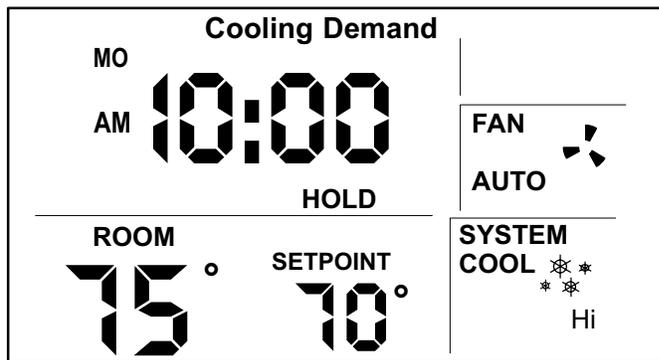


Figure 11

Cooling operation is indicated by flashing “snowflake” icons in the SYSTEM box. When the actual temperature drops below the temperature setpoint, the snowflake icons will disappear. This indicates that the cooling demand has been satisfied and that the cooling equipment has been turned off.

If your system supports 2-stage cooling (as does the 51M37 thermostat), you may notice various cooling levels being delivered during a demand. Also, if a small cooling demand is present, “Lo” will be displayed in the SYSTEM box. However, if a large cooling demand is present, “Hi” will be displayed in the SYSTEM box (shown in figure 11).

NOTE - If no buttons are pressed during a demand for cooling, the equipment must operate for at least 4 minutes. After a demand has been satisfied, cooling equipment operation is locked out for 5 minutes. If another cooling demand occurs during this 5-minute interval, “COOL” and the snowflakes will flash; however, the cooling equipment will not operate until the 5-minute delay has elapsed.

HOLD - Using Temperature Hold Modes

When HOLD is displayed at the HOME screen, the thermostat is in a temperature hold condition. This means that the temperature program data is ignored and the thermostat functions much like a non-programmable thermostat.

Adjusting Temperature Setpoint in Hold Mode

The temperature setpoint represents the desired temperature of the space around the thermostat. The default temperature setpoint in Hold mode is 70°F.

To adjust the setpoint, press the UP or DOWN (▲▼) arrow buttons (see figure 12); the existing setpoint is displayed to the right of the actual room temperature. Each button press adjusts the setpoint up or down by 1 degree.

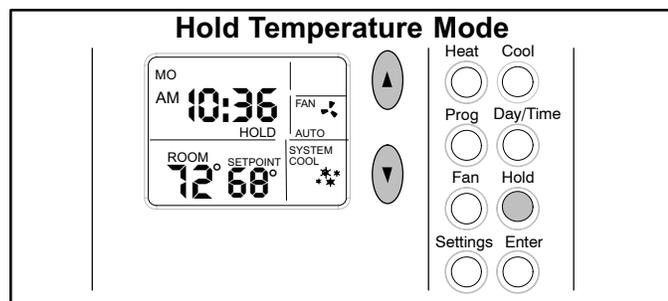


Figure 12

After the desired setpoint is reached, the HOME screen will reappear after about 15 seconds.

Permanent Hold Mode

At any time the program is running, from the HOME screen, set a permanent hold (program override) by pressing the HOLD button (see figure 12). The thermostat now functions much like a non-programmable thermostat. Use the Up/Down arrow buttons to adjust the hold setpoint. To return to the program, press HOLD again.

Temporary (2-Hour) Hold

At any time the program is running, from the HOME screen, set a temporary 2-hour hold by pressing the Up/Down arrow buttons until the desired setpoint is displayed; "HOLD" flashes (see figure 13). This overrides the program for 2 hours from the last button press, then returns to the program.

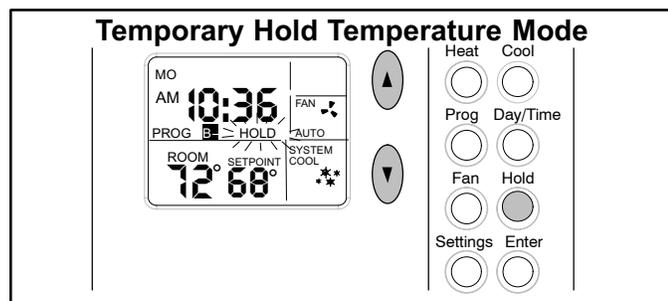


Figure 13

While in Temporary Hold, press HOLD once to switch to Permanent Hold (HOLD displays solid; PROG not displayed); press HOLD again to return to the program (PROG displays; HOLD not displayed).

PROG - Thermostat Programming

The 51M37 thermostat can be programmed to perform a set of either heating or cooling events (but not a combination of heat and cool) for 5 consecutive days using a set of 4 unique events per day. The remaining 2 days can then be set for a different set of 4 unique events per day. Both the consecutive days and the events/temperature are set by the homeowner.

To Change Consecutive Days...

To alter the 5 consecutive days, **press and hold** the PROG button for 5 seconds. The 5 consecutive day period is then displayed (default is MOnday thru FRiday). To change to a different 5-consecutive days, use the Up/Down arrow buttons. Any 5 consecutive-day span may be selected, for example, in figure 14, Saturday through Wednesday is defined as the 5-day programming (Thursday and Friday would constitute the 2-day programming). Press the PROG button when finished.

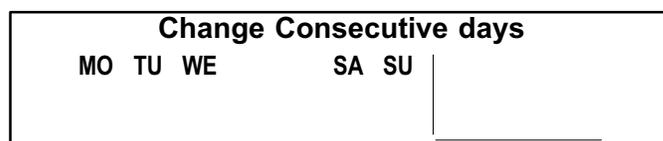


Figure 14

To Set Program Events and Temperatures...

Figure 15 gives an example of how the two sets of programs can be set for a normal workweek and weekend.

In the 5-day bar graph, note how programs **A** and **C** reflect the desired warmth while the home IS occupied (72°); **B** allows less heating while the home is NOT occupied; **D** reflects a cooler sleeping temperature. The 2-day bar graph would support day-long occupancy and, because the first program begins later, a less-demanding time schedule.

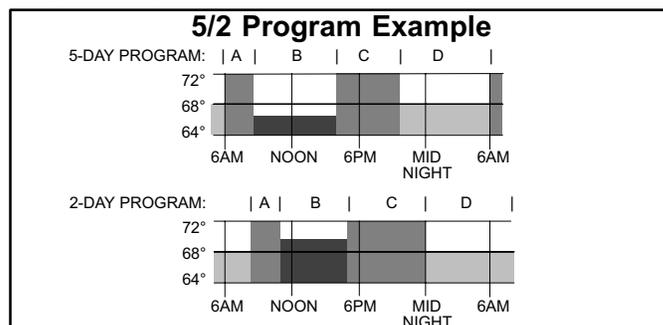


Figure 15

NOTE - Pressing ENTER during the following programming steps, saves and exits to the HOME screen.

To program events and temperatures, perform the following steps, once with Cool selected and once with Heat selected.

1. Press and release PROG. "AM 6:00", period "A", and the 5 consecutive days are displayed; "AM 6" flashes.
2. Use the Up/Down arrow buttons to select the desired hour; press PROG when the desired hour is reached.
3. Use the Up/Down arrow buttons to select the desired minute; press PROG.
4. Use the Up/Down arrow buttons to select the desired temperature setpoint; press PROG.

5. Repeat steps 2 through 4 for periods B, C, and D.
6. Repeat steps 1 through 5 for the 2-day program.

NOTE - This thermostat will NOT automatically switch from heating to cooling, or vice versa; operator involvement is required. At the change of seasons, or to accommodate abnormal seasonal temperature swings, you must manually select to the opposite conditioning (Heat or Cool) program.

FAN - Controlling the Fan Operation

Use the FAN button to select either continuous fan mode or auto fan mode.

To change from continuous to auto fan mode (or vice versa), press the FAN button. Note whether a fan icon in the FAN box is present (indicating that the fan is running) or not (fan not running).

If continuous fan mode is enabled (ON displayed in FAN box - see figure 16), the fan will run continuously regardless of whether the heating or cooling equipment is running.

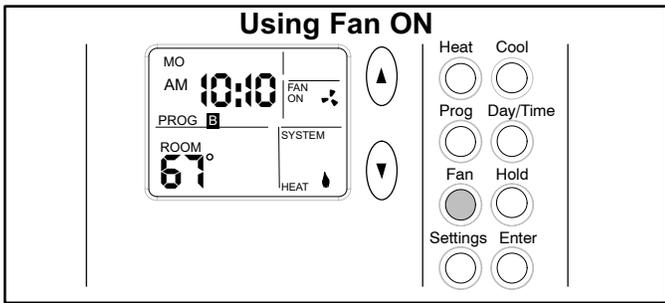


Figure 16

If auto fan mode is selected (AUTO displayed in FAN box - see figure 17), the fan will only run when the heating or cooling equipment is running.

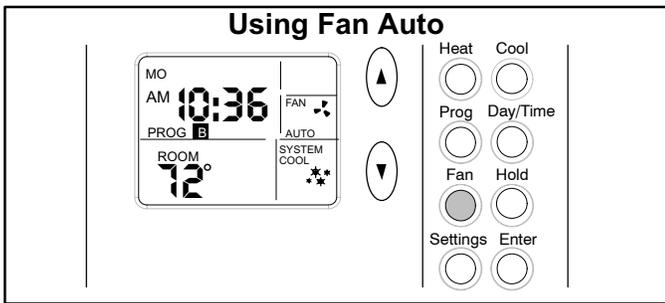


Figure 17

SETTINGS - Filter/Maintenance Reminders

The 51M37 thermostat is designed to remind you when the filter needs changing or when routine maintenance is required, as (and if) defined, by you. These optional reminders are not enabled until you activate them. To do so, press the Settings button (shown below the Fan button in figure 17) once or twice for the desired reminder as shown in figure 18 and as described in table 1.

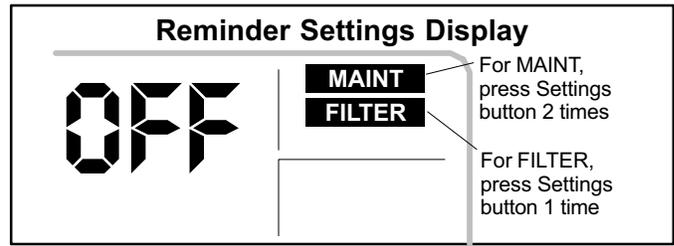


Figure 18

The default setting for the reminders is OFF (disabled). Press Up/Down arrow buttons to select the desired reminder intervals.

Table 1

Filter and Maintenance Reminders		
Buttons to Use	Reminder	Available Settings and How to Use
Settings (1st press) then Arrows to scroll selections	FILTER	Total fan run time expressed in months (Off, 1, 3, 6, 12); for example, if fan runs 12 hours a day, 1 month reminder displays in 2 calendar months.
Settings (2nd press) then Arrows to scroll selections	MAINT	Elapsed chronological time in months (Off, 6, 12). Use this, for example, to remind yourself when to perform routine checks or when to call a technician for periodic preventive maintenance.
Enter		Stores settings.

NOTE - The HOME screen will reappear about 15 seconds after the final arrow button press. OR, press ENTER at any time to store any changes and exit to the HOME screen. After either programmed interval has elapsed, the reminder will be displayed as shown in figure 19.

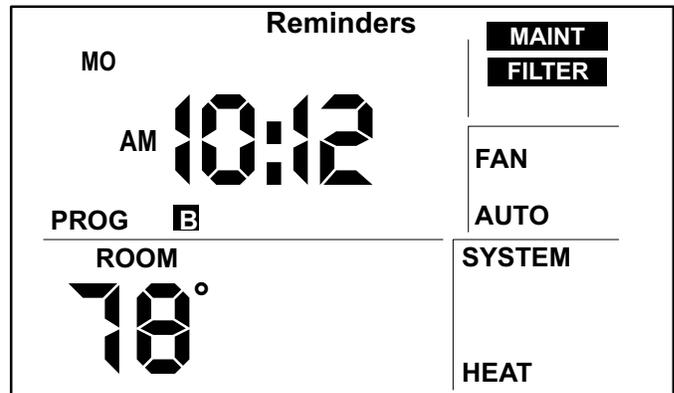


Figure 19

After the filter has been changed or maintenance performed, reset the reminder by pressing the SETTINGS button for 4 seconds. The screen will blink for a few moments to indicate that the timer has been reset.

SETTINGS - Balance Point

NOTE - The balance point is only available with the outdoor sensor.

If the optional outdoor sensor (X2658) is connected to the thermostat, balance point adjustment is available. The balance point feature allows the measured outdoor temperature to govern operation of the heat pump and backup heat source.

Use the SETTINGS button to access the balance point setting. If the outdoor sensor is attached to the thermostat, press the SETTINGS button three times to access the Balance Point Settings screen (see figure 20).

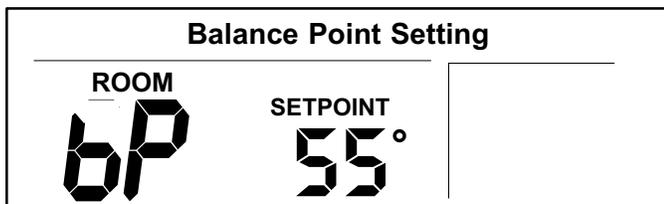


Figure 20

The balance point can be set at any temperature between 1°F and 55°F (-17°C to 13°C). A balance point setting of zero disables the balance point function (in this case, the thermostat behaves as if no outdoor sensor is attached). The default balance point setting is 55°F.

To adjust the balance point up or down, press the Up/Down arrow buttons to the right of the display screen. The balance point setting increases by 1°F each time the Up button is pressed and decreases by 1°F each time the Down button is pressed.

After the desired balance point is reached, the HOME screen will reappear after about 15 seconds.

NOTE - The balance point feature allows the outdoor temperature to rise or fall 3°F above or below the balance point. This prevents excessive cycling of the equipment when the outdoor temperature is near the balance point. For example, if the balance point is 40°F and the actual outdoor temperature is 35°F, the outdoor temperature must rise to 43°F before equipment adjustment occurs. Conversely, if the balance point is 40°F and the actual outdoor temperature is 45°F, the outdoor temperature must drop to 37°F before equipment adjustment occurs.

Service Indicator

When abnormal equipment operation is detected, the SERVICE indicator will flash on the screen (see figure 21). This indicates that the equipment requires service from a qualified service technician.

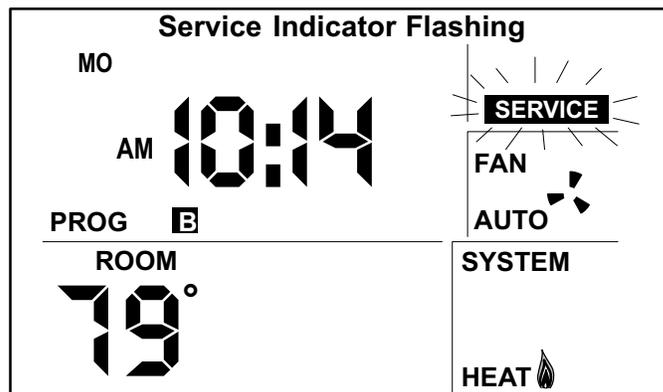


Figure 21

Thermostat RESET

Under some abnormal conditions, it may be necessary to “reset” the thermostat to its default condition. Such a RESET would delete all programming and settings and therefore should only be used on rare occasions when the thermostat fails to function as designed and/or as programmed. Such an instance can occur as a result of a power surge or similar electrical disturbance (e.g. after an electrical storm or power outage). The RESET button can be used to recover from this situation.

CAUTION

When the RESET button is pressed, ALL settings revert back to the defaults, including the default program (see tables 2 and 3).

The RESET button is an unlabeled, recessed button located behind the door, on the right-hand side of the thermostat, below the SETTINGS button (see figure 3). Use a paper clip or small pencil to press the RESET button; ALL thermostat settings will be reset to the defaults listed in the Default Thermostat Settings section.

Removing/Installing Thermostat

The thermostat hinges on tabs on the top of the subbase; no tool is needed to remove the thermostat from the subbase. Pivot the bottom of the thermostat outward (releasing the snaps), then lift up to remove.

To replace it, first position the top tilted toward the wall bracket and align it until you feel the tabs and slots engage; then, while the top is in place, pivot the bottom toward the wall until the thermostat snaps into place.

Default Thermostat Settings

Default thermostat settings are shown in table 2 and the default program is shown in table 3.

Table 2

Default Thermostat Settings	
Mode	Heat (Permanent Hold Mode)
Setpoint	70°F (or 21°C)
Fan	Auto
Filter Reminder	OFF
Maintenance Reminder	OFF
Equipment Protection Timers	Reset Back to Zero

Table 3

Default Program Settings			
Programs	Time	Temperature (Heat)	Temperature (Cool)
Weekday - A	6:00am	70°F / 21°C	78°F / 26°C
Weekday - B	8:00am	62°F / 17°C	85°F / 29°C
Weekday - C	6:00pm	70°F / 21°C	78°F / 26°C
Weekday - D	10:00pm	62°F / 17°C	82°F / 28°C
Weekend - A	6:00am	70°F / 21°C	78°F / 26°C
Weekend - B	8:00am	62°F / 17°C	85°F / 29°C
Weekend - C	6:00pm	70°F / 21°C	78°F / 26°C
Weekend - D	10:00pm	62°F / 17°C	82°F / 28°C
Weekday	Monday, Tuesday, Wednesday, Thursday, Friday		
Weekend	Saturday, Sunday		

Technical Specifications

Thermostat Type

Electronic programmable thermostat for heat pump, 3-stage heat/2-stage cool.

NOTE - 2 stages of heat pump heat and one stage of auxiliary (gas or electric) backup heat are supported.

Power Supply Range

18VAC - 30VAC (24VAC nominal), 60Hz

CAUTION

24VAC is present on the terminals of the thermostat bracket. If removing the thermostat from the wall, use caution and avoid touching any of the connector terminals on the wall bracket.

Also, when working with the thermostat dip switches, use a non-conductive tool and take caution to avoid making any contact with the circuit board, its imprinted circuitry and its connector prongs.

Temperature Display

Display Scale: Fahrenheit or Celsius user selectable (via DIP switch; see figure 22)

Display range: 35°F (2°C) to 99°F (37°C)

Display resolution: 1°F (1°C)

Display Accuracy: +/-1°F

If the Fahrenheit/Celsius display must be changed, use a plastic, non-conductive tool to push the dip switch to the right position (see figure 22).

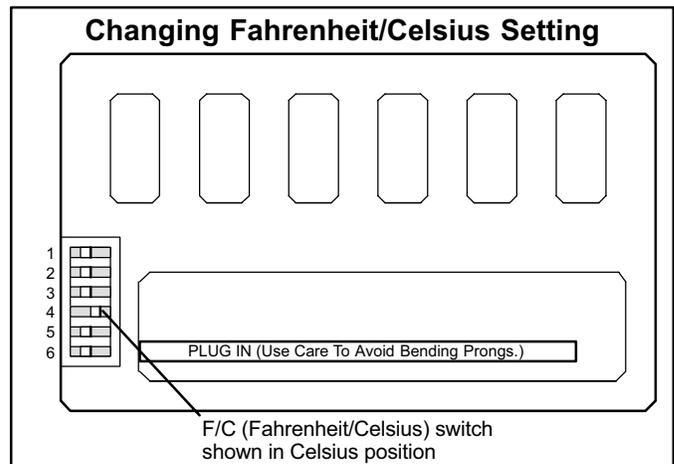


Figure 22

Temperature Measurement Range

Measurement Scale: Fahrenheit

Measurement Range: 35°F to 99°F

Measurement Resolution: 0.5°F

Measurement Accuracy: +/-1°F

Field Offset: via DIP switches to +/-3°F

Sampling Method: temperature measurements sampled every 15 seconds. Displayed temperature is the average of the last four measurements.

Temperature Setpoint Range

Setting range: 50°F (10°C) to 90°F (32°C)

Setting resolution: 1°F (1°C)

Smart Setback Recovery (via DIP switch #6)

Smart Setback Recovery (SSR) affects the way the thermostat responds to program events. If SSR is disabled, the thermostat will react to a program event at the time the event occurs. However, if SSR is enabled, the thermostat will react to a program event before the event occurs such that the desired temperature is reached at the time of the event, not after.

Fan Control

AUTO or ON modes.

I/O Relays

All thermostat relays are latching type to minimize power consumption.

Table 4

51M37 Terminal Designations	
Term.	Description
B	Reversing valve, heat active
O	Reversing valve, cool active
R	24VAC
Y1	First-stage cooling/heating, compressor energized
W1*	Auxiliary heating, furnace energized
Y2	Second-stage cooling/heating, compressor energized
E*	Emergency heat
G	Fan control
L	Service Indicator
C	24VAC common
T	Outdoor temperature sensor connection 1
T	Outdoor temperature sensor connection 2

** For most applications, E will be jumpered to W1. If separate wires are not provided for both E and W1, jumper the E terminal to the W1 terminal on the thermostat sub-base. For applications involving the use of a balance point (whereby the outdoor temperature is to be used to restrict either heat pump operation or backup heat source operation), the optional outdoor sensor (part number X2658) MUST be installed.*

Equipment Protection Timers

Minimum Compressor OFF time: 5 minutes

Minimum Compressor ON time: 4 minutes

Minimum Furnace ON time: 3 minutes

Minimum furnace cycle time (elapsed time between any furnace activation and the next furnace activation): 6 minutes.

Minimum elapsed time between any compressor activation and the next compressor activation: 6 minutes.

NOTE - All protection timers (except the compressor OFF timer) can be over-ridden if a heating or cooling demand is initiated or terminated using the UP, DOWN, HEAT, or COOL buttons.

Equipment Protection Override

Both the minimum compressor OFF timer and the minimum equipment cycle timer can be over-ridden by pressing and holding either the HEAT or COOL button down for 4 seconds.

Over-Temperature Protection

Thermal-mechanical switch opens W1, Y1, Y2, and E at 93°F+/-6°F.

Filter Reminder

Settings of Off, 1, 3, 6 or 12 (months of fan run time) are available. When programmed time has elapsed, a FILTER indicator is displayed.

Maintenance Reminder

Settings of Off, 6 or 12 (months of chronological time) are available. When programmed time has elapsed, a maintenance indicator "MAINT" is displayed.

Service Reminder

The SERVICE indicator is displayed only under the following conditions:

- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the R terminal;
OR
- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the C terminal.

Power Loss/Recovery

Thermostat memory is retained for a minimum of 24 hours during a power loss (includes retention of program information, HOLD status, programmed temperature setpoint, heat/cool and fan mode settings, filter reminder status, maintenance reminder status, and equipment protection timers). After 24 hours of power loss, programmed settings will be lost and replaced with default settings.

IMPORTANT

Power must be applied for at least six consecutive hours prior to a power loss in order for memory to be retained for the specified time.

LCD Backlight

Activated for 30 seconds when any button is pressed.

NOTE - During an electrical storm or similar disturbance, the backlight may activate for a few seconds. This is normal and will no longer occur after the electrical disturbance has passed.

Thermostat Operating Conditions

35°F to 105°F, 5% to 90% RH

Thermostat Storage Conditions

-40°F to 185°F, 5% to 95% RH

Thermostat Output Table

Table 5 depicts the 51M37 thermostat output states for various input conditions. The following notes described terms used in the table.

NOTES:

- *X = output is activated with 24VAC.*
- *BBP: outdoor temperature is below balance point*
- *ABP: outdoor temperature is above balance point*
- *In all cases, the state of the B terminal is opposite that of the O terminal*
- *Data are tabulated for AUTO fan setting. If the fan setting is ON, the G output is activated in all cases*
- *Upstage timers:*
 - 30 minutes (when upstaging from small to large demand)*
 - 15 minutes (HEAT MODE ONLY - when upstaging from large to very large demand)*
- *The temperature ranges expressed in the following definitions of "SMALL/LARGE/VERY LARGE" demands are for guidance only; actual temperatures may vary:*
 - With a small HEAT demand, temperature is: below **setpoint -0.5F** but above **setpoint -1.5F** AND 30-minute upstage timer HAS NOT expired.*
 - With a large HEAT demand, temperature is: less than **setpoint -1.5F** OR 30-minute upstage timer HAS expired.*
 - With a very large heat demand, temperature is: below **setpoint -2.5F** OR 15-minute 2nd upstage timer HAS expired.*
 - Emergency heat demand (only if emergency heat is enabled): temperature is below **setpoint -0.5F**.*
 - With a small COOL demand, temperature is: above **setpoint +0.5F** but below **setpoint +1.5F** AND 30-minute upstage timer HAS NOT expired.*
 - With a large COOL demand, temperature is: above **setpoint +1.5F** OR 30-minute upstage timer HAS expired.*

Table 5

THERMOSTAT OUTPUTS						
Demand Condition	W1	E	Y1	Y2	G	O
Cooling Demands						
SMALL			X		X	X
LARGE			X	X	X	X
No Demand						X
Heating Demands						
w/Electric Backup (no outdoor sensor)						
SMALL			X		X	
LARGE			X	X	X	
Very LARGE	X		X	X	X	
Emergency		X			X	
No Demand						
w/Gas Backup (dual fuel; no outdoor sensor)						
SMALL			X		X	
LARGE			X	X	X	
Very LARGE	X					
Emergency		X				
No Demand						
w/Electric Backup (outdoor sensor attached)						
SMALL (Above Balance Point)			X		X	
LARGE (ABP)			X	X	X	
Very LARGE (ABP)			X	X	X	
SMALL (Below Balance Point)			X		X	
LARGE (BBP)			X	X	X	
Very LARGE (BBP)	X		X	X	X	
Emergency		X			X	
No Demand						
w/Gas Backup (dual fuel; outdoor sensor attached)						
SMALL (ABP)			X		X	
LARGE (ABP)			X	X	X	
Very LARGE (ABP)	X					
SMALL (BBP)	X					
LARGE (BBP)	X					
Very LARGE (BBP)	X					
Emergency		X				
No Demand						



**RETAIN THESE INSTRUCTIONS
 FOR FUTURE REFERENCE**

51M35 Merit® Series Thermostat

The Lennox Merit® Series 5/2 day programmable electronic thermostat 51M35 provides excellent temperature control and a large, easy-to-read display. This product includes a programmable filter change reminder, an equipment maintenance reminder, and a system check indicator to notify the user when the equipment requires service.

Thermostat 51M35 is suitable for non-heat pump, two-stage heat/two-stage cool applications using a gas or electric furnace.

General

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

Introduction

This document describes the operation of Lennox thermostat 51M35. Refer to the installation manual for instructions regarding installation and wiring of the thermostat.

Initial Thermostat Power-up

When power is initially applied to the thermostat, the display will appear as shown in figure 1.

OPERATION MANUAL

51M35 Merit® Series

5/2 Day Programmable Thermostat

CONTROLS
 505,049M
 05/05
 Supersedes 03/05

TP Technical
 Publications
 Litho U.S.A.

Table of Contents

51M35 Series Thermostat	1
General	1
Introduction	1
Initial Thermostat Power-up	1
Buttons, Backlight, Timers & Settings	2
DAY/TIME - Set Day and Time	2
HEAT - Heat Mode	3
COOL - Cool Mode	3
HOLD - Temperature Hold Mode	4
PROG - Thermostat Programming	4
FAN - Controlling Fan Operation	5
SETTINGS - Filter /Maintenance Reminder	5
Service Indicator	6
Thermostat RESET	6
Removing/Installing Thermostat	6
Default Thermostat Settings	6
Technical Specifications	7
Thermostat Output Table	8

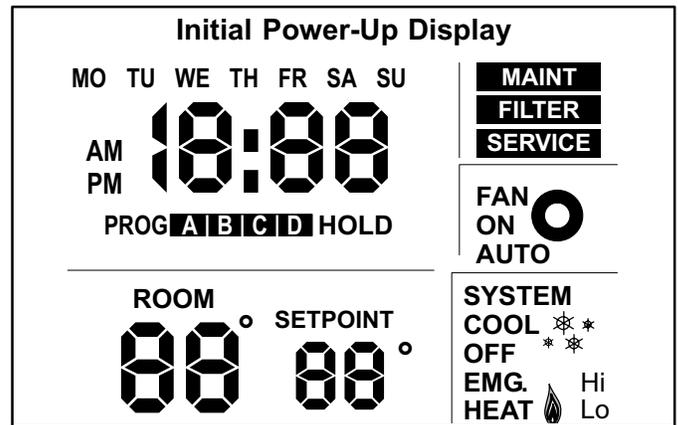


Figure 1

All display segments are momentarily activated. This occurs as a normal part of thermostat initialization.



Within a few seconds, the Home Screen appears (see figure 2) with default settings as shown. After about 1 minute of initialization time, the actual room temperature will be displayed.

NOTE - Tables 2 and 3 on page 6 show all system and programming defaults.

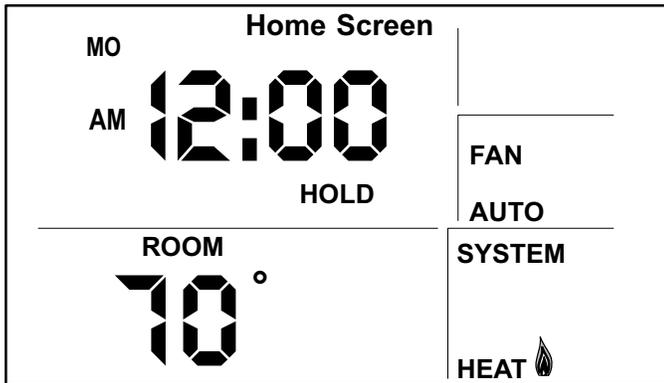


Figure 2

At this point, the thermostat will be fully functional; its default temperature setpoint (not shown) is 70°F. At this point, if the equipment has been fully powered and if a heat demand were present, the system would begin operating.

NOTE - Temperature scale default is Fahrenheit units but may be reset to show Celsius, if desired. See page 7.

Buttons, Backlight, Timers & Settings

Buttons are located behind the small door on the right-hand side of the thermostat (see figure 3).

⚠ IMPORTANT

Do NOT begin pressing buttons until after you read the following section describing each button.

A pale blue display backlight illuminates for 30 seconds each time any button is pressed.

When PROG or DAY/TIME is pressed, a field begins flashing, expecting another input. Start making changes within 15 seconds or the HOME screen will return.

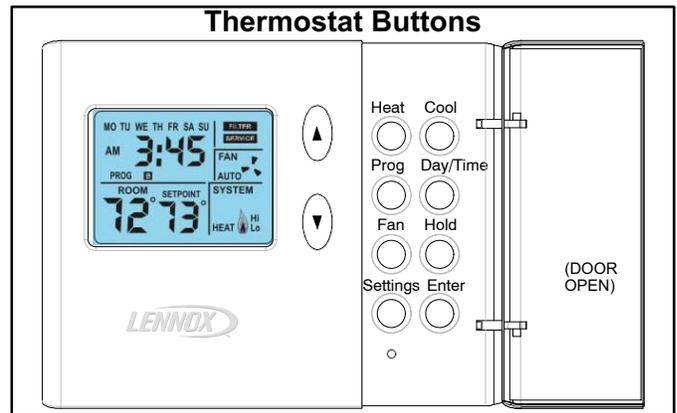


Figure 3

When an Arrow, HOLD, HEAT, or COOL button is pressed, SETPOINT and the temperature setting appears for 15 seconds. If desired, start making changes within 15 seconds or the HOME screen will return. The backlight will turn off 15 seconds after the HOME screen reappears.

DAY/TIME - Setting the Day and Time

Press the DAY/TIME button and set the CURRENT hour, minute, and day of week as follows:

1. "AM12" will flash on the screen. Press the UP/DOWN arrows to change the hour. ("AM" or "PM" must correspond to time of day.) Press DAY/TIME **OR**, if adjusting for daylight savings time, pressing ENTER stores the single change and exits to the HOME screen, bypassing minutes and day of week.
2. Minutes will flash. Use the UP/DOWN arrow button to display the minutes past the hour. Press DAY/TIME.
3. Day "MO" (Monday) will flash. Use UP or DOWN arrow buttons to display the current day. Day selections are abbreviated as "MO", "TU", "WE", "TH", "FR", "SA", and "SU". Press DAY/TIME.
4. The HOME screen reappears; confirm day and time are correct. This completes day and time setting.

HEAT - Using the Heat Mode

Enabling and Disabling Heat Mode

The thermostat must be in the HEAT mode to control the heating equipment. Press the Heat button to enable or disable HEAT mode. If the thermostat is in COOL or OFF mode, pressing the Heat button enables the HEAT mode (indicated by HEAT in the SYSTEM box - see figure 4).

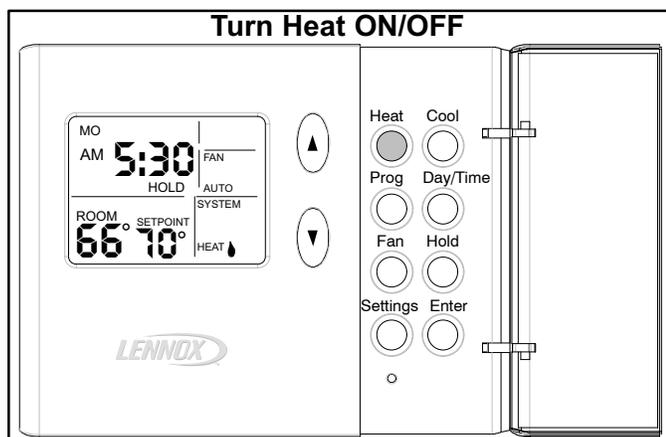


Figure 4

If the thermostat is in heat mode, pressing the Heat button disables HEAT mode (indicated by OFF in the SYSTEM box - see figure 5).

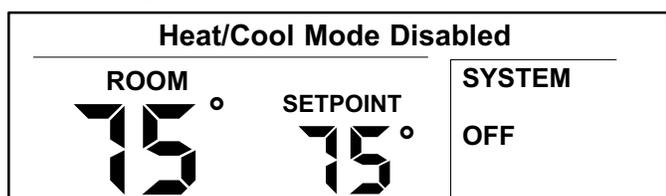


Figure 5

Heating Demand

Set the thermostat to heat mode to control the heating equipment. Then, if the room temperature is lower than the temperature setpoint, as shown in figure 6, the thermostat detects a heating demand and will activate the heating equipment to satisfy the demand.

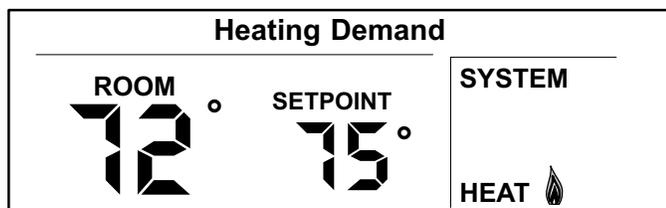


Figure 6

Heating operation is indicated by a flame icon in the SYSTEM box. When the actual temperature rises above the temperature setpoint, the flame icon will disappear. This indicates that the heating demand has been satisfied and that the heating equipment has been turned off.

If your system supports 2-stage heating (as does the 51M35 thermostat), you may notice various heating levels being delivered during a demand.

NOTE - Heating equipment is activated for at least 3 minutes if no buttons are pressed during the demand interval.

COOL - Using the Cool Mode

Enabling and Disabling Cool Mode

Use the COOL button to enable or disable cool mode as desired. If the thermostat is in HEAT or OFF mode, cool mode is enabled when the COOL button is pressed. This is indicated by COOL in the SYSTEM box (see figure 8).

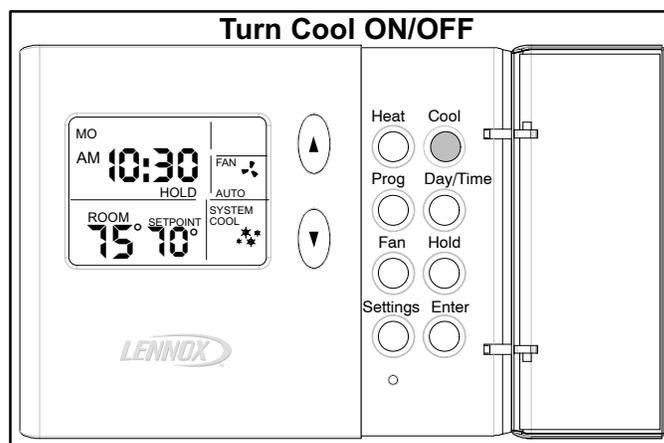


Figure 7

If the thermostat is in cool mode, pressing the Cool button disables COOL mode (indicated by OFF in the SYSTEM box - see figure 5).

Cooling Demand

Set the thermostat to cool mode to control the cooling equipment. Then, if the room temperature is higher than the temperature setpoint, as shown in figure 8, the thermostat detects a cooling demand and will activate the cooling equipment to satisfy the demand.

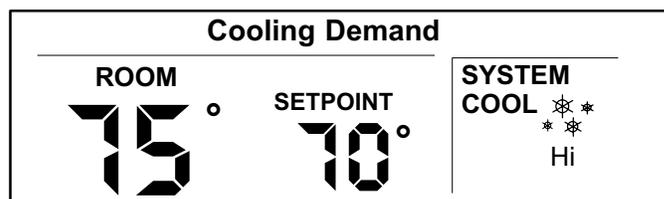


Figure 8

Cooling operation is indicated by flashing "snowflake" icons in the SYSTEM box. When the actual temperature drops below the temperature setpoint, the snowflake icons will disappear. This indicates that the cooling demand has been satisfied and that the cooling equipment has been turned off.

If your system supports 2-stage cooling (as does the 51M35 thermostat), you may notice various cooling levels being delivered during a demand. Also, if a small cooling demand is present, "Lo" will be displayed in the SYSTEM box. However, if a large cooling demand is present, "Hi" will be displayed in the SYSTEM box (shown in figure 8).

NOTE - If no buttons are pressed during a demand for cooling, the equipment must operate for at least 4 minutes. After a demand has been satisfied, cooling equipment operation is locked out for 5 minutes. If another cooling demand occurs during this 5-minute interval, "COOL" and the snowflakes will flash; however, the cooling equipment will not operate until the 5-minute delay has elapsed.

HOLD - Using Temperature Hold Modes

When HOLD is displayed at the HOME screen, the thermostat is in a temperature hold condition. This means that the temperature program data is ignored and the thermostat functions much like a non-programmable thermostat.

Adjusting Temperature Setpoint in Hold Mode

The temperature setpoint represents the desired temperature of the space around the thermostat. The default temperature setpoint in Hold mode is 70°F.

To adjust the setpoint, press the UP or DOWN (▲▼) arrow buttons (see figure 9); the existing setpoint is displayed to the right of the actual room temperature. Each button press adjusts the setpoint up or down by 1 degree.

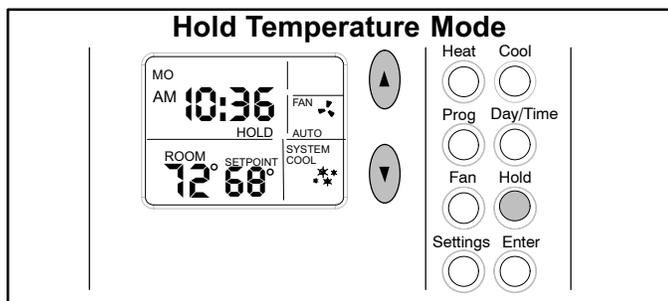


Figure 9

After the desired setpoint is reached, the HOME screen will reappear after about 15 seconds.

Permanent Hold Mode

At any time the program is running, from the HOME screen, set a permanent hold (program override) by pressing the HOLD button (see figure 9). The thermostat now functions much like a non-programmable thermostat. Use the Up/Down arrow buttons to adjust the hold setpoint. To return to the program, press HOLD again.

Temporary (2-Hour) Hold

At any time the program is running, from the HOME screen, set a temporary 2-hour hold by pressing the Up/Down arrow buttons until the desired setpoint is displayed; "HOLD" flashes (see figure 10). This overrides the program for 2 hours from the last button press, then returns to the program.

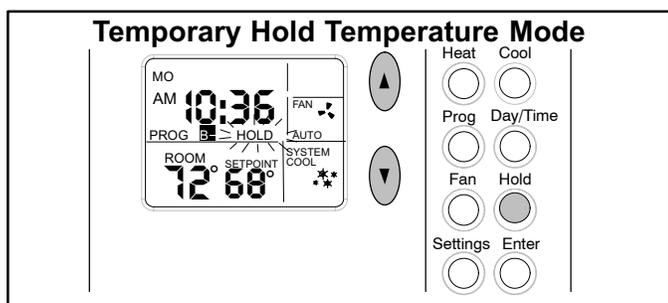


Figure 10

While in Temporary Hold, press HOLD once to switch to Permanent Hold (HOLD displays solid; PROG not displayed); press HOLD again to return to the program (PROG displays; HOLD not displayed).

PROG - Thermostat Programming

The 51M35 thermostat can be programmed to perform a set of either heating or cooling events (but not a combination of heat and cool) for 5 consecutive days using a set of 4 unique events per day. The remaining 2 days can then be set for a different set of 4 unique events per day. Both the consecutive days and the events/temperature are set by the homeowner.

To Change Consecutive Days...

To alter the 5 consecutive days, press and hold the PROG button for 5 seconds. The existing 5 consecutive day period is then displayed (default is MOnday thru FRiday). To change to a different 5-consecutive days, use the Up/Down arrow buttons. Any 5 consecutive-day span may be selected, for example, in figure 11, Saturday through Wednesday is defined as the 5-day programming (Thursday and Friday would constitute the 2-day programming). Press the PROG button when finished.

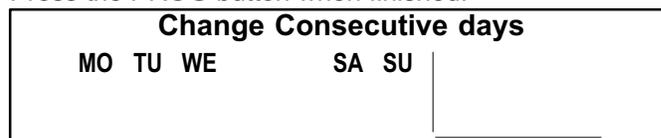


Figure 11

To Set Program Events and Temperatures...

Figure 12 gives an example of how the two sets of programs can be set for a normal workweek and weekend. In the 5-day bar graph, note how programs A and C reflect the desired warmth while the home IS occupied (72°); B allows less heating while the home is NOT occupied; D reflects a cool sleeping temperature. The 2-day bar graph would support day-long occupancy and, because the first program begins later, a less-demanding time schedule.

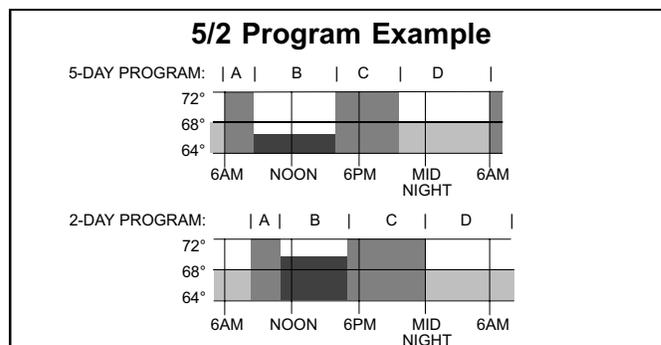


Figure 12

NOTE - Pressing ENTER during the following programming steps, saves and exits to the HOME screen.

To program events and temperatures, perform the following steps, once with Cool selected and once with Heat selected.

1. Press and release PROG. "AM 6:00", period "A", and the 5 consecutive days are displayed; "AM 6" flashes.
2. Use the Up/Down arrow buttons to select the desired hour; press PROG when the desired hour is reached.
3. Use the Up/Down arrow buttons to select the desired minute; press PROG.
4. Use the Up/Down arrow buttons to select the desired temperature setpoint; press PROG.
5. Repeat steps 2 through 4 for periods B, C, and D.
6. Repeat steps 1 through 5 for the 2-day program.

NOTE - This thermostat will **NOT** automatically switch from heating to cooling, or vice versa; operator involvement is required. At the change of seasons, or to accommodate abnormal seasonal temperature swings, you must manually select to the opposite conditioning (Heat or Cool) program.

FAN - Controlling the Fan Operation

Use the FAN button to select either continuous fan mode or auto fan mode.

To change from continuous to auto fan mode (or vice versa), press the FAN button. Note whether a fan icon in the FAN box is present (indicating that the fan is running) or not (fan not running).

If continuous fan mode is enabled (ON displayed in FAN box - see figure 13), the fan will run continuously regardless of whether the heating or cooling equipment is running.

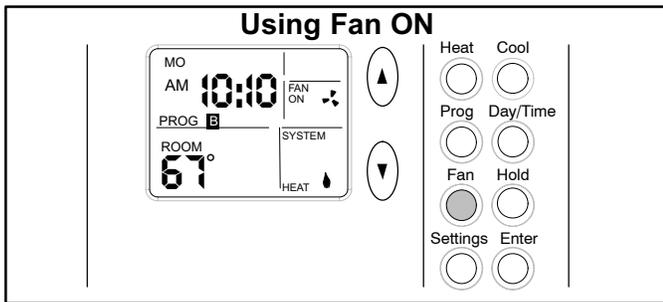


Figure 13

If auto fan mode is selected (AUTO displayed in FAN box - see figure 14), the fan will only run when the heating or cooling equipment is running.

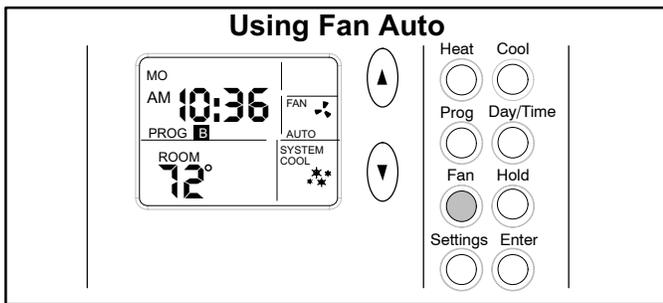


Figure 14

SETTINGS - Filter/Maintenance Reminders

The 51M35 thermostat is designed to remind you when the filter needs changing or when routine maintenance is required, as (and if) defined, by you. These optional reminders are not enabled until you activate them. To do so, press the Settings button (shown below the Fan button in figure 14) once or twice for the desired reminder as shown in figure 15 and as described in table 1.

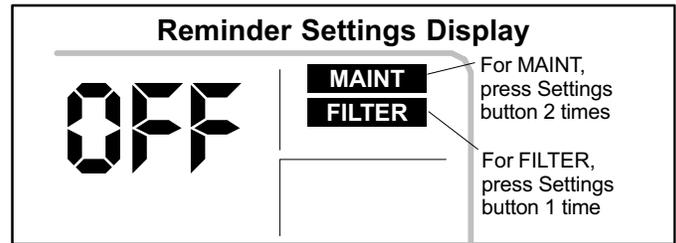


Figure 15

The default setting for the reminders is OFF (disabled). Press Up/Down arrow buttons to select the desired reminder intervals.

Table 1

Filter and Maintenance Reminders		
Buttons to Use	Reminder	Available Settings and How to Use
Settings (1st press) then Arrows to scroll selections	FILTER	Total fan run time expressed in months (Off, 1, 3, 6, 12); for example, if fan runs 12 hours a day, 1 month reminder displays in 2 calendar months.
Settings (2nd press) then Arrows to scroll selections	MAINT	Elapsed chronological time in months (Off, 6, 12). Use this, for example, to remind yourself when to perform routine checks or when to call a technician for periodic preventive maintenance.
Enter		Stores settings.

NOTE - The HOME screen will reappear about 15 seconds after the final arrow button press. OR, press ENTER at any time to store any changes and exit to the HOME screen. After either programmed interval has elapsed, the reminder will be displayed as shown in figure 16.

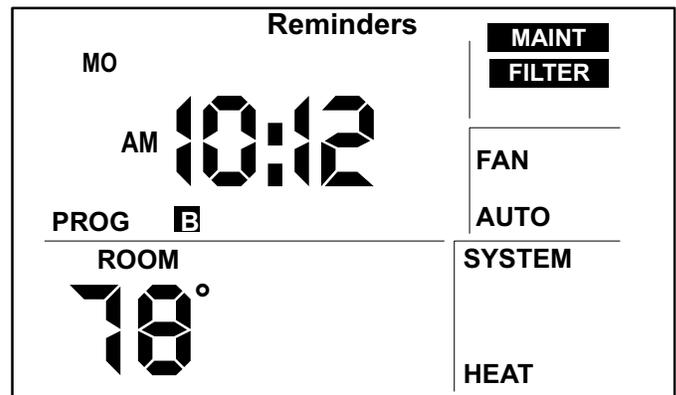


Figure 16

After the filter has been changed or maintenance performed, reset the reminder by pressing the SETTINGS button for 4 seconds. The screen will blink for a few moments to indicate that the timer has been reset.

Service Indicator

When abnormal equipment operation is detected, the SERVICE indicator will flash on the screen (see figure 17). This indicates that the equipment requires service from a qualified service technician.

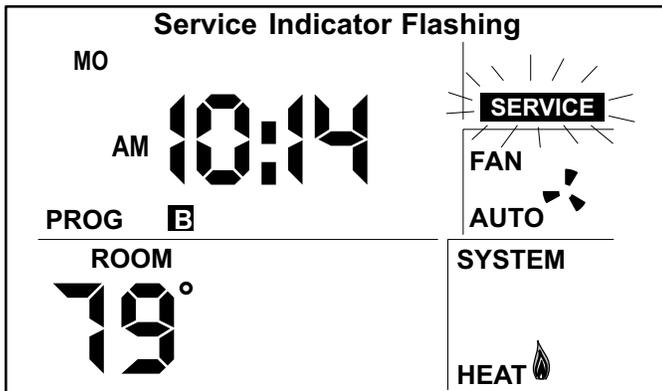


Figure 17

Thermostat RESET

Under some abnormal conditions, it may be necessary to “reset” the thermostat to its default condition. Such a RESET would delete all programming and settings and therefore should only be used on rare occasions when the thermostat fails to function as designed and/or as programmed. Such an instance can occur as a result of a power surge or similar electrical disturbance (e.g. after an electrical storm or power outage). The RESET button can be used to recover from this situation.

⚠ CAUTION

When the RESET button is pressed, ALL settings revert back to the defaults, including the default program (see tables 2 and 3).

The RESET button is an unlabeled, recessed button located behind the door on the right-hand side of the thermostat, below the SETTINGS button (see figure 3). Use a paper clip or small pencil to press the RESET button; ALL thermostat settings will be reset to the defaults listed in the Default Thermostat Settings section.

Removing and Installing Thermostat

The thermostat hinges on tabs on the top of the subbase; no tool is needed to remove the thermostat from the subbase. Pivot the bottom of the thermostat outward (releasing the snaps), then lift up to remove.

To install it, first position the top tilted toward the wall bracket and align it until you feel the tabs and slots engage; then, while the top is in place, pivot the bottom toward the wall until the thermostat snaps into place.

Default Thermostat Settings

Default thermostat settings are in table 2 and the default program is shown in table 3.

Table 2

Default Thermostat Settings	
Mode	Heat (Permanent Hold Mode)
Setpoint	70°F (or 21°C)
Fan	Auto
Filter Reminder	OFF
Maintenance Reminder	OFF
Equipment Protection Timers	Reset Back to Zero

Table 3

Default Program Settings			
Programs	Time	Temperature (Heat)	Temperature (Cool)
Weekday - A	6:00am	70°F / 21°C	78°F / 26°C
Weekday - B	8:00am	62°F / 17°C	85°F / 29°C
Weekday - C	6:00pm	70°F / 21°C	78°F / 26°C
Weekday - D	10:00pm	62°F / 17°C	82°F / 28°C
Weekend - A	6:00am	70°F / 21°C	78°F / 26°C
Weekend - B	8:00am	62°F / 17°C	85°F / 29°C
Weekend - C	6:00pm	70°F / 21°C	78°F / 26°C
Weekend - D	10:00pm	62°F / 17°C	82°F / 28°C
Weekday	Monday, Tuesday, Wednesday, Thursday, Friday		
Weekend	Saturday, Sunday		

Technical Specifications

Thermostat Type

Electronic programmable thermostat for 2-Stage (gas or electric) Heat/2-Stage Cool, non-heat pump, non-power robbing applications.

Power Supply Range

18VAC - 30VAC (24VAC nominal), 60Hz

⚠ CAUTION

24VAC is present on the terminals of the thermostat bracket. If removing the thermostat from the wall, use caution and avoid touching any of the connector terminals on the wall bracket.

Also, when working with the thermostat dip switches, use a non-conductive tool and take caution to avoid making any contact with the circuit board, its imprinted circuitry and its connector prongs.

Temperature Display

Display Scale: Fahrenheit or Celsius user selectable (via DIP switch; see figure 18)

Display range: 35°F (2°C) to 99°F (37°C)

Display resolution: 1°F (1°C)

Display Accuracy: +/-1°F

If the Fahrenheit/Celsius display must be changed, use a plastic, non-conductive tool to push the dip switch to the right position (see figure 18).

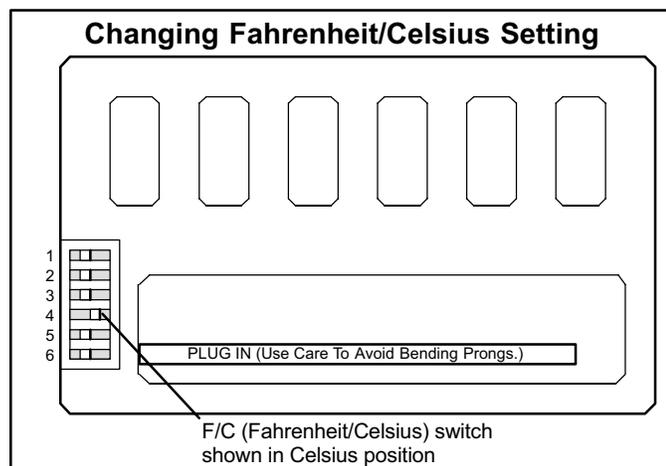


Figure 18

Temperature Measurement Range

Measurement Scale: Fahrenheit

Measurement Range: 35°F to 99°F

Measurement Resolution: 0.5°F

Measurement Accuracy: +/-1°F

Field Offset: via DIP switches to +/-3°F

Sampling Method: temperature measurements sampled every 15 seconds. Displayed temperature is the average of the last four measurements.

Temperature Setpoint Range

Setting range: 50°F (10°C) to 90°F (32°C)

Setting resolution: 1°F (1°C)

Smart Setback Recovery (via DIP switch #6)

Smart Setback Recovery (SSR) affects the way the thermostat responds to program events. If SSR is disabled, the thermostat will react to a program event at the time the event occurs. However, if SSR is enabled, the thermostat will react to a program event before the event occurs such that the desired temperature is reached at the time of the event, not after.

Fan Control

AUTO or ON modes, gas or electric heat compatible via DIP switches (also see Thermostat Output section).

I/O Relays

All thermostat relays are latching type to minimize power consumption.

Table 4

51M35 Terminal Designations	
Terminal	Description
R	24VAC
Y1	First-stage cooling
W1	First-stage heating
Y2	Second-stage cooling
W2	Second-stage heating
G	Fan control
L	Service Indicator
C	24VAC common

Equipment Protection Timers

Minimum Compressor OFF time: 5 minutes

Minimum Compressor ON time: 4 minutes

Minimum Furnace ON time: 3 minutes

Minimum furnace cycle time (elapsed time between any furnace activation and the next furnace activation): 6 minutes.

Minimum elapsed time between any compressor activation and the next compressor activation: 6 minutes.

NOTE - All protection timers (except the compressor OFF timer) can be over-ridden if a heating or cooling demand is initiated or terminated using the UP, DOWN, HEAT, or COOL buttons.

Equipment Protection Override

Both the minimum compressor OFF timer and the minimum equipment cycle timer can be over-ridden by pressing and holding either the HEAT or COOL button down for 4 seconds.

Over-Temperature Protection

Thermal-mechanical switch opens W1 and W2 at 93°F +/-6°F.

Filter Reminder

Settings of Off, 1, 3, 6 or 12 (months of fan run time) are available. When programmed time has elapsed, a FILTER indicator is displayed.

Maintenance Reminder

Settings of Off, 6 or 12 (months of chronological time) are available. When programmed time has elapsed, a maintenance indicator "MAINT" is displayed.

Service Reminder

The SERVICE indicator is displayed only under the following conditions:

- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the R terminal;
OR
- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the C terminal.

Power Loss/Recovery

Thermostat memory is retained for a minimum of 24 hours during a power loss (includes retention of program information, HOLD status, programmed temperature setpoint, heat/cool and fan mode settings, filter reminder status, maintenance reminder status, and equipment protection timers). After 24 hours of power loss, programmed settings will be lost and replaced with default settings.

⚠ IMPORTANT

Power must be applied for at least six consecutive hours prior to a power loss in order for memory to be retained for the specified time.

LCD Backlight

Activated for 30 seconds when any button is pressed.

NOTE - During an electrical storm or similar disturbance, the backlight may activate for a few seconds. This is normal and will no longer occur after the electrical disturbance has passed.

Thermostat Operating Conditions

35°F to 105°F, 5% to 90% RH

Thermostat Storage Conditions

-40°F to 185°F, 5% to 95% RH

Thermostat Output Table

Table 5 depicts the 51M35 thermostat output states for various input conditions. The following notes described terms used in the table.

NOTE - X = output is activated with 24VAC.

NOTE - The temperature ranges expressed in the following definitions of "SMALL/LARGE" demands are for guidance only; actual temperatures may vary.

With a small HEAT demand, temperature is: below setpoint -0.5F but above setpoint -1.5F AND 30-minute upstage timer HAS NOT expired.

With a large HEAT demand, temperature is: less than setpoint -1.5F OR 30-minute upstage timer HAS expired.

With a small COOL demand, temperature is: above setpoint +0.5F but below setpoint +1.5F AND 30-minute upstage timer HAS NOT expired.

With a large COOL demand, temperature is: above setpoint +1.5F OR 30-minute upstage timer HAS expired.

Table 5

Thermostat Outputs					
Condition	W1	W2	Y1	Y2	G
Gas Heat, Auto Fan					
HEAT Demand, SMALL	X				
HEAT Demand, LARGE	X	X			
COOL Demand, SMALL			X		X
COOL Demand, LARGE			X	X	X
No Demand					
Gas Heat, Continuous Fan					
HEAT Demand, SMALL	X				X
HEAT Demand, LARGE	X	X			X
COOL Demand, SMALL			X		X
COOL Demand, LARGE			X	X	X
No Demand					X
Electric Heat, Auto Fan					
HEAT Demand, SMALL	X				X
HEAT Demand, LARGE	X	X			X
COOL Demand, SMALL			X		X
COOL Demand, LARGE			X	X	X
No Demand					
Electric Heat, Continuous Fan					
HEAT Demand, SMALL	X				X
HEAT Demand, LARGE	X	X			X
COOL Demand, SMALL			X		X
COOL Demand, LARGE			X	X	X
No Demand					X



RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE

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Thermostat 51M34 is suitable for non-heat pump, single-stage heat/single-stage cool applications with either gas or electric furnace.

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These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

Introduction

This document describes the operation of Lennox thermostat 51M34. Refer to the installation manual for instructions regarding installation and wiring of the thermostat.

Initial Thermostat Power-up

When power is initially applied to the thermostat, the display will appear as shown in figure 1.

OPERATION MANUAL

51M34 Merit® Series

5/2 Day Programmable Thermostat

CONTROLS
505,048M
05/05
Supersedes 03/05

TP Technical Publications
Litho U.S.A.

Table of Contents

51M34 Series Thermostat	1
General	1
Introduction	1
Initial Thermostat Power-up	1
Buttons, Backlight, Timers & Settings	2
DAY/TIME - Set Day and Time	2
HEAT - Heat Mode	3
COOL - Cool Mode	3
HOLD - Temperature Hold Mode	4
PROG - Thermostat Programming	4
FAN - Controlling Fan Operation	5
SETTINGS - Filter /Maintenance Reminder	5
Service Indicator	6
Thermostat RESET	6
Removing/Installing Thermostat	6
Default Thermostat Settings	6
Technical Specifications	7
Thermostat Output Table	8

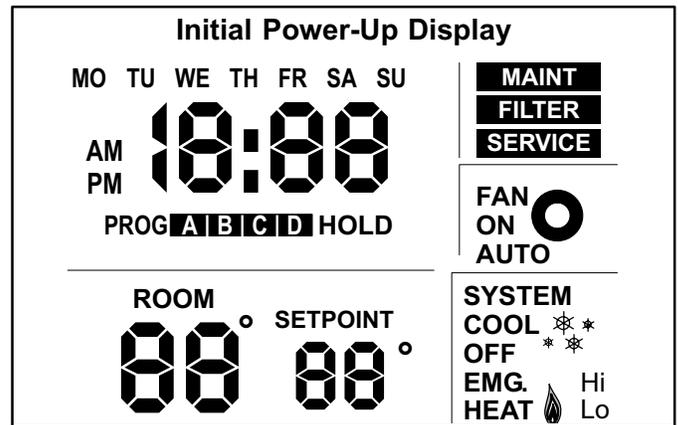


Figure 1

All display segments are momentarily activated. This occurs as a normal part of thermostat initialization.



Within a few seconds, the Home Screen appears (see figure 2) with default settings as shown. After about 1 minute of initialization time, the actual room temperature will be displayed.

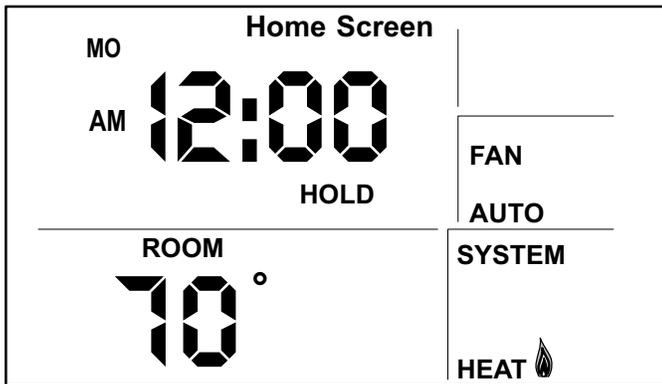


Figure 2

At this point, the thermostat will be fully functional; its default temperature setpoint (not shown) is 70°F. At this point, if the equipment has been fully powered and if a heat demand were present, the system would begin operating.

NOTE - Temperature scale default is Fahrenheit units but may be reset to show Celsius, if desired. See page 7.

Buttons, Backlight, Timers & Settings

Buttons are located behind the small door on the right-hand side of the thermostat (see figure 3).

⚠ IMPORTANT

Do NOT begin pressing buttons until after you read the following section describing each button.

A pale blue display backlight illuminates for 30 seconds each time any button is pressed.

When PROG or DAY/TIME is pressed, a field begins flashing, expecting another input. Start making changes within 15 seconds or the HOME screen will return.

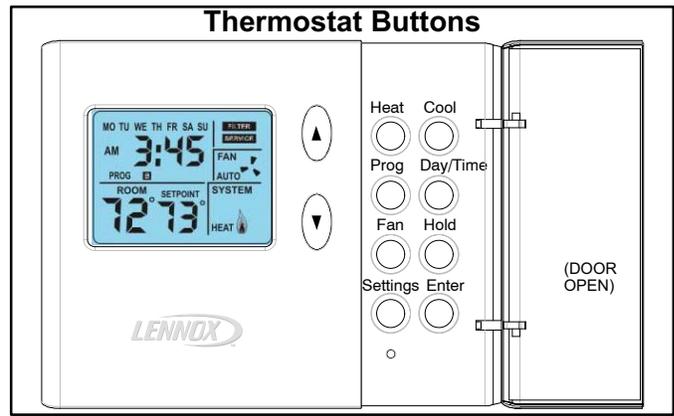


Figure 3

When an Arrow, HOLD, HEAT, or COOL button is pressed, SETPOINT and the temperature setting appears for 15 seconds. If desired, start making changes within 15 seconds or the HOME screen will return. The backlight will turn off 15 seconds after the HOME screen reappears.

DAY/TIME - Setting the Day and Time

Press the DAY/TIME button and set the CURRENT hour, minute, and day of week as follows:

1. "AM12" will flash on the screen. Press the UP/DOWN arrows to change the hour. ("AM" or "PM" must correspond to time of day.) Press DAY/TIME **OR**, if adjusting for daylight savings time, pressing ENTER stores the single change and exits to the HOME screen, bypassing minutes and day of week.
2. Minutes will flash. Use the UP/DOWN arrow button to display the minutes past the hour. Press DAY/TIME.
3. Day "MO" (Monday) will flash. Use UP or DOWN arrow buttons to display the current day. Day selections are abbreviated as "MO", "TU", "WE", "TH", "FR", "SA", and "SU". Press DAY/TIME.
4. The HOME screen reappears; confirm day and time are correct. This completes day and time setting.

HEAT - Using the Heat Mode

Enabling and Disabling Heat Mode

The thermostat must be in the HEAT mode to control the heating equipment. Press the Heat button to enable or disable HEAT mode. If the thermostat is in COOL or OFF mode, pressing the Heat button enables the HEAT mode (indicated by HEAT in the SYSTEM box - see figure 4).

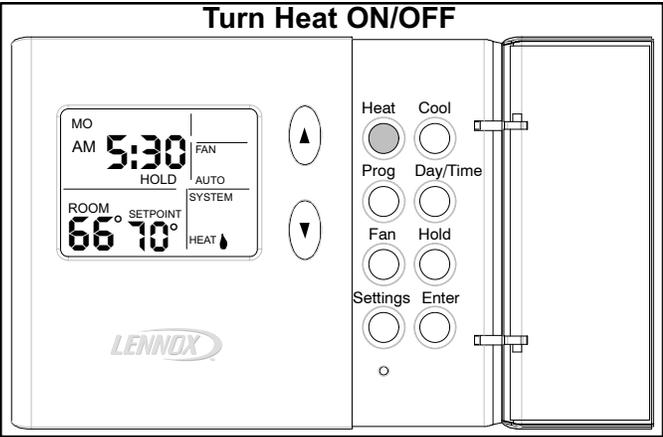


Figure 4

If the thermostat is in heat mode, heat mode is disabled when the HEAT button is pressed. This is indicated by OFF in the SYSTEM box as shown in figure 5.

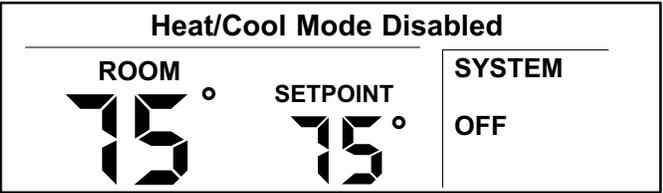


Figure 5

Heating Demand

Set the thermostat to heat mode to control the heating equipment. Then, if the room temperature is lower than the temperature setpoint, as shown in figure 6, the thermostat detects a heating demand and will activate the heating equipment to satisfy the demand.

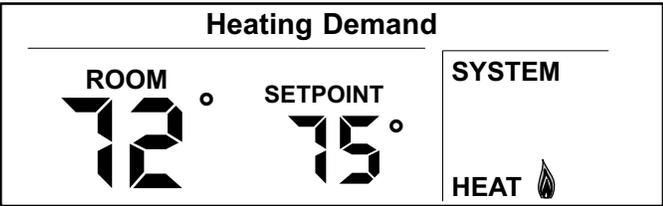


Figure 6

Heating operation is indicated by a flame icon in the SYSTEM box. When the actual temperature rises above the temperature setpoint, the flame icon will disappear. This indicates that the heating demand has been satisfied and that the heating equipment has been turned off.

NOTE - Heating equipment is activated for at least 3 minutes if no buttons are pressed during the demand interval.

COOL - Using the Cool Mode

Enabling and Disabling Cool Mode

Use the COOL button to enable or disable cool mode as desired. If the thermostat is in HEAT or OFF mode, cool mode is enabled when the COOL button is pressed. This is indicated by COOL in the SYSTEM box (see figure 7).

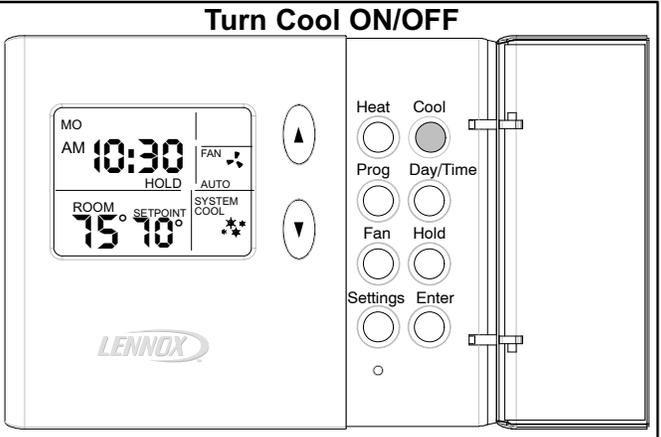


Figure 7

If the thermostat is in cool mode, pressing the Cool button disables COOL mode (indicated by OFF in the SYSTEM box - see figure 5).

Cooling Demand

Set the thermostat to cool mode to control the cooling equipment. Then, if the room temperature is higher than the temperature setpoint, as shown in figure 8, the thermostat detects a cooling demand and will activate the cooling equipment to satisfy the demand.

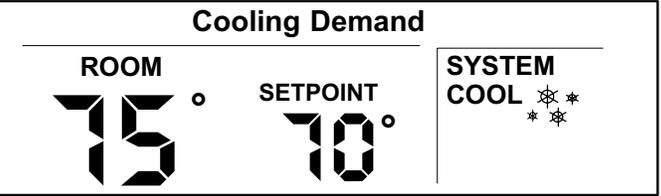


Figure 8

Cooling operation is indicated by flashing “snowflake” icons in the SYSTEM box. When the actual temperature drops below the temperature setpoint, the snowflake icons will disappear. This indicates that the cooling demand has been satisfied and that the cooling equipment has been turned off.

NOTE - If no buttons are pressed during a demand for cooling, the equipment must operate for at least 4 minutes. After a demand has been satisfied, cooling equipment operation is locked out for 5 minutes. If another cooling demand occurs during this 5-minute interval, “COOL” and the snowflakes will flash; however, the cooling equipment will not operate until the 5-minute delay has elapsed.

HOLD - Using Temperature Hold Modes

When HOLD is displayed at the HOME screen, the thermostat is in a temperature hold condition. This means that the temperature program data is ignored and the thermostat functions much like a non-programmable thermostat.

Adjusting Temperature Setpoint in Hold Mode

The temperature setpoint represents the desired temperature of the space around the thermostat. The default temperature setpoint in Hold mode is 70°F.

To adjust the setpoint, press the UP or DOWN (▲▼) arrow buttons (see figure 9); the existing setpoint is displayed to the right of the actual room temperature. Each button press adjusts the setpoint up or down by 1 degree.

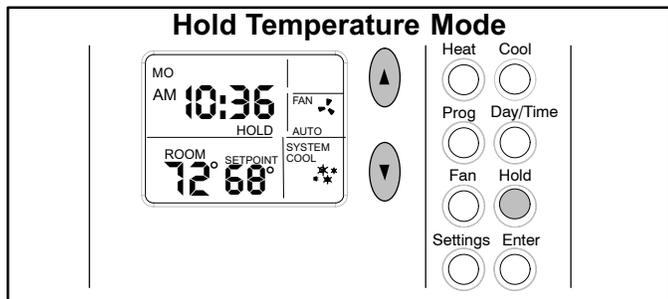


Figure 9

After the desired setpoint is reached, the HOME screen will reappear after about 15 seconds.

Permanent Hold Mode

At any time the program is running, from the HOME screen, set a permanent hold (program override) by pressing the HOLD button (see figure 9). The thermostat now functions much like a non-programmable thermostat. Use the Up/Down arrow buttons to adjust the hold setpoint. To return to the program, press HOLD again.

Temporary (2-Hour) Hold

At any time the program is running, from the HOME screen, set a temporary 2-hour hold by pressing the Up/Down arrow buttons until the desired setpoint is displayed; "HOLD" flashes (see figure 10). This overrides the program for 2 hours from the last button press, then returns to the program.

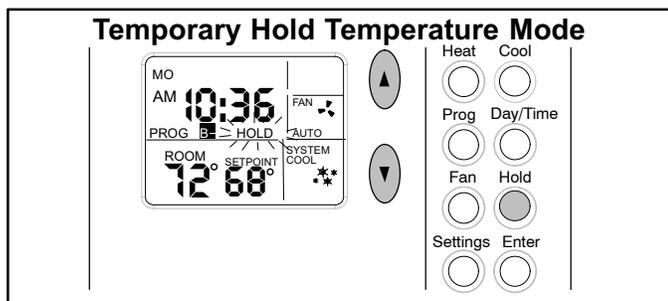


Figure 10

While in Temporary Hold, press HOLD once to switch to Permanent Hold (HOLD displays solid; PROG not displayed); press HOLD again to return to the program (PROG displays; HOLD not displayed).

PROG - Thermostat Programming

The 51M34 thermostat can be programmed to perform a set of either heating or cooling events (but not a combination of heat and cool) for 5 consecutive days using a set of 4 unique events per day. The remaining 2 days can then be set for a different set of 4 unique events per day. Both the consecutive days and the events/temperature are set by the homeowner.

To Change Consecutive Days...

To alter the 5 consecutive days, press and hold the PROG button for 5 seconds. The existing 5 consecutive day period is then displayed (default is MOnday thru FRiday). To change to a different 5-consecutive days, use the Up/Down arrow buttons. Any 5 consecutive-day span may be selected, for example, in figure 11, Saturday through Wednesday is defined as the 5-day programming (Thursday and Friday would constitute the 2-day programming). Press the PROG button when finished.

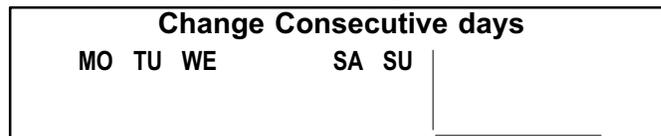


Figure 11

To Set Program Events and Temperatures...

Figure 12 gives an example of how the two sets of programs can be set for a normal workweek and weekend. In the 5-day bar graph, note how programs A and C reflect the desired warmth while the home IS occupied (72°); B allows less heating while the home is NOT occupied; D reflects a cool sleeping temperature. The 2-day bar graph would support day-long occupancy and, because the first program begins later, a less-demanding time schedule.

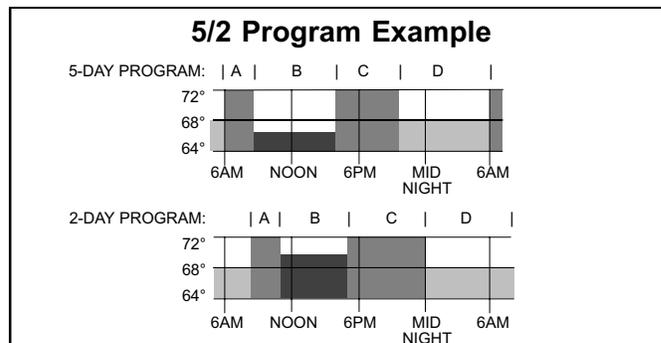


Figure 12

NOTE - Pressing ENTER during the following programming steps, saves and exits to the HOME screen.

To program events and temperatures, perform the following steps, once with Cool selected and once with Heat selected.

1. Press and release PROG. "AM 6:00", period "A", and the 5 consecutive days are displayed; "AM 6" flashes.
2. Use the Up/Down arrow buttons to select the desired hour; press PROG when the desired hour is reached.
3. Use the Up/Down arrow buttons to select the desired minute; press PROG.
4. Use the Up/Down arrow buttons to select the desired temperature setpoint; press PROG.
5. Repeat steps 2 through 4 for periods B, C, and D.
6. Repeat steps 1 through 5 for the 2-day program.

NOTE - This thermostat will **NOT** automatically switch from heating to cooling, or vice versa; operator involvement is required. At the change of seasons, or to accommodate abnormal seasonal temperature swings, you must manually select to the opposite conditioning (Heat or Cool) program.

FAN - Controlling the Fan Operation

Use the FAN button to select either continuous fan mode or auto fan mode.

To change from continuous to auto fan mode (or vice versa), press the FAN button. Note whether a fan icon in the FAN box is present (indicating that the fan is running) or not (fan not running).

If continuous fan mode is enabled (ON displayed in FAN box - see figure 13), the fan will run continuously regardless of whether the heating or cooling equipment is running.

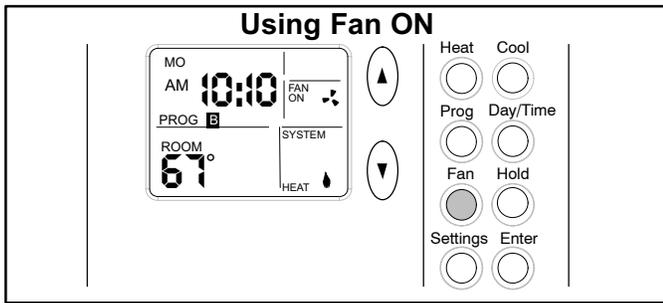


Figure 13

If auto fan mode is selected (AUTO displayed in FAN box - see figure 14), the fan will only run when the heating or cooling equipment is running.

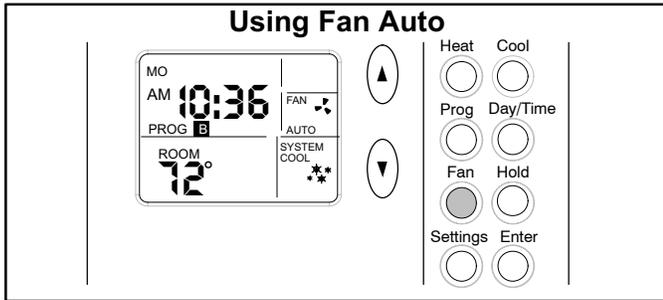


Figure 14

SETTINGS - Filter/Maintenance Reminders

The 51M34 thermostat is designed to remind you when the filter needs changing or when routine maintenance is required, as (and if) defined, by you. These optional reminders are not enabled until you activate them. To do so, press the Settings button (shown below the Fan button in figure 14) once or twice for the desired reminder as shown in figure 15 and as described in table 1.

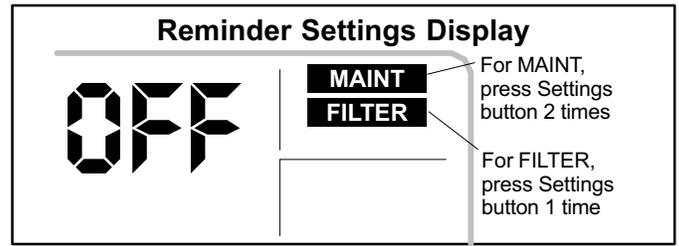


Figure 15

The default setting for the reminders is OFF (disabled). Press Up/Down arrow buttons to select the desired reminder intervals.

Table 1

Filter and Maintenance Reminders		
Buttons to Use	Reminder	Available Settings and How to Use
Settings (1st press) then Arrows to scroll selections	FILTER	Total fan run time expressed in months (Off, 1, 3, 6, 12); for example, if fan runs 12 hours a day, 1 month reminder displays in 2 calendar months.
Settings (2nd press) then Arrows to scroll selections	MAINT	Elapsed chronological time in months (Off, 6, 12). Use this, for example, to remind yourself when to perform routine checks or when to call a technician for periodic preventive maintenance.
Enter		Stores settings.

NOTE - The HOME screen will reappear about 15 seconds after the final arrow button press. OR, press ENTER at any time to store any changes and exit to the HOME screen. After either programmed interval has elapsed, the reminder will be displayed as shown in figure 16.

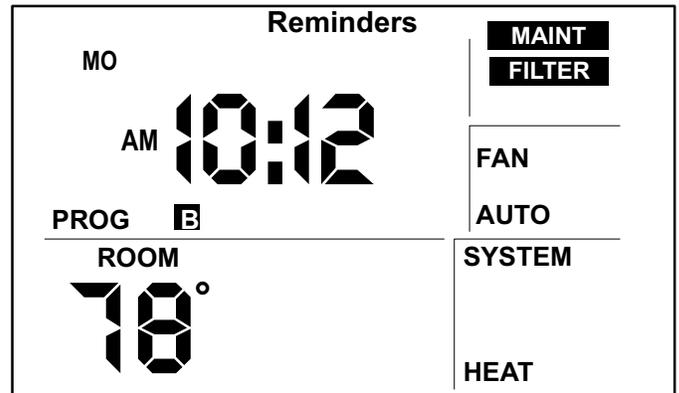


Figure 16

After the filter has been changed, reset the filter reminder by pressing the SETTINGS button for 4 seconds. The screen will blink for a few moments to indicate that the timer has been reset.

Service Indicator

When abnormal equipment operation is detected, the SERVICE indicator will flash on the screen (see figure 17). This indicates that the equipment requires service from a qualified service technician.

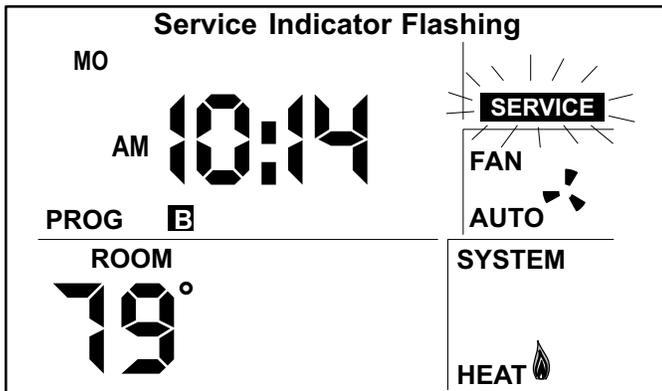


Figure 17

Thermostat RESET

Under some abnormal conditions, it may be necessary to “reset” the thermostat to its default condition. Such a RESET would delete all programming and settings and therefore should only be used on rare occasions when the thermostat fails to function as designed and/or as programmed. Such an instance can occur as a result of a power surge or similar electrical disturbance (e.g. after an electrical storm or power outage). The RESET button can be used to recover from this situation.

⚠ CAUTION

When the RESET button is pressed, ALL settings revert back to the defaults, including the default program (see tables 2 and 3).

The RESET button is an unlabeled, recessed button located behind the door on the right-hand side of the thermostat, below the SETTINGS button (see figure 3). Use a paper clip or small pencil to press the RESET button; ALL thermostat settings will be reset to the defaults listed in the Default Thermostat Settings section.

Removing/Installing Thermostat

The thermostat hinges on tabs on the top of the subbase; no tool is needed to remove the thermostat from the subbase. Pivot the bottom of the thermostat outward (releasing the snaps), then lift up to remove.

To replace it, first position the top tilted toward the wall bracket and align it until you feel the tabs and slots engage; then, while the top is in place, pivot the bottom toward the wall until the thermostat snaps into place.

Default Thermostat Settings

Default thermostat settings are in table 2 and the default program is shown in table 3.

Table 2

Default Thermostat Settings	
Mode	Heat (Permanent Hold Mode)
Setpoint	70°F (or 21°C)
Fan	Auto
Filter Reminder	OFF
Maintenance Reminder	OFF
Equipment Protection Timers	Reset Back to Zero

Table 3

Default Program Settings			
Programs	Time	Temperature (Heat)	Temperature (Cool)
Weekday - A	6:00am	70°F / 21°C	78°F / 26°C
Weekday - B	8:00am	62°F / 17°C	85°F / 29°C
Weekday - C	6:00pm	70°F / 21°C	78°F / 26°C
Weekday - D	10:00pm	62°F / 17°C	82°F / 28°C
Weekend - A	6:00am	70°F / 21°C	78°F / 26°C
Weekend - B	8:00am	62°F / 17°C	85°F / 29°C
Weekend - C	6:00pm	70°F / 21°C	78°F / 26°C
Weekend - D	10:00pm	62°F / 17°C	82°F / 28°C
Weekday	Monday, Tuesday, Wednesday, Thursday, Friday		
Weekend	Saturday, Sunday		

Technical Specifications

Thermostat Type

Electronic programmable thermostat for 1-Stage-Heat/1-Stage Cool, gas or electric heat, non-heat pump, non-power robbing applications.

Power Supply Range

18VAC - 30VAC (24VAC nominal), 60Hz

⚠ CAUTION

24VAC is present on the terminals of the thermostat bracket. If removing the thermostat from the wall, use caution and avoid touching any of the connector terminals on the wall bracket.

Also, when working with the thermostat dip switches, use a non-conductive tool and take caution to avoid making any contact with the circuit board, its imprinted circuitry and its connector prongs.

Temperature Display

Display Scale: Fahrenheit or Celsius user selectable (via DIP switch; see figure 18)

Display range: 35°F (2°C) to 99°F (37°C)

Display resolution: 1°F (1°C)

Display Accuracy: +/-1°F

If the Fahrenheit/Celsius display must be changed, use a plastic, non-conductive tool to push the dip switch to the right position (see figure 18).

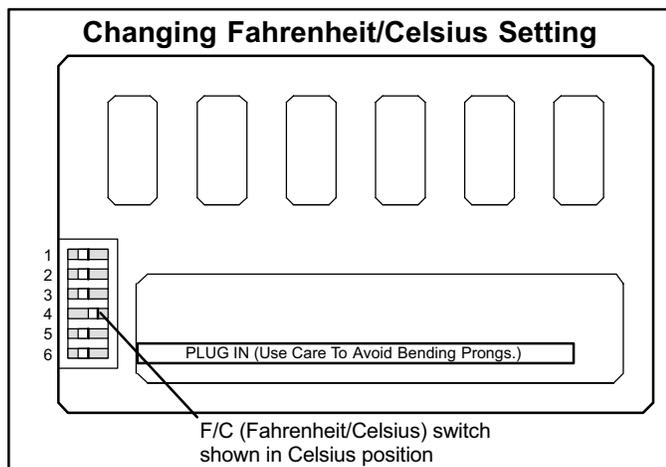


Figure 18

Temperature Measurement Range

Measurement Scale: Fahrenheit

Measurement Range: 35°F to 99°F

Measurement Resolution: 0.5°F

Measurement Accuracy: +/-1°F

Field Offset: via DIP switches to +/-3°F

Sampling Method: temperature measurements sampled every 15 seconds. Displayed temperature is the average of the last four measurements.

Temperature Setpoint Range

Setting range: 50°F (10°C) to 90°F (32°C)

Setting resolution: 1°F (1°C)

Smart Setback Recovery (via DIP switch #6)

Smart Setback Recovery (SSR) affects the way the thermostat responds to program events. If SSR is disabled, the thermostat will react to a program event at the time the event occurs. However, if SSR is enabled, the thermostat will react to a program event before the event occurs such that the desired temperature is reached at the time of the event, not after.

Fan Control

AUTO or ON modes, gas or electric heat compatible via DIP switches (also see Thermostat Output section).

I/O Relays

All thermostat relays are latching type to minimize power consumption.

Table 4

51M34 Terminal Designations	
Terminal	Description
R	24VAC
Y1	First stage cooling
W1	First stage heating
G	Fan control
L	Service Indicator
C	24VAC common

Equipment Protection Timers

Minimum Compressor OFF time: 5 minutes

Minimum Compressor ON time: 4 minutes

Minimum Furnace ON time: 3 minutes

Minimum furnace cycle time (elapsed time between any furnace activation and the next furnace activation): 6 minutes.

Minimum elapsed time between any compressor activation and the next compressor activation: 6 minutes.

NOTE - All protection timers (except the compressor OFF timer) can be over-ridden if a heating or cooling demand is initiated or terminated using the UP, DOWN, HEAT, or COOL buttons.

Equipment Protection Override

Both the minimum compressor OFF timer and the minimum equipment cycle timer can be over-ridden by pressing and holding either the HEAT or COOL button down for 4 seconds.

Over-Temperature Protection

Thermal-mechanical switch opens W1 at 93°F +/-6°F.

Filter Reminder

Settings of Off, 1, 3, 6 or 12 (months of fan run time) are available. When programmed time has elapsed, a FILTER indicator is displayed.

Maintenance Reminder

Settings of Off, 6 or 12 (months of chronological time) are available. When programmed time has elapsed, a maintenance indicator "MAINT" is displayed.

Service Reminder

The SERVICE indicator is displayed only under the following conditions:

- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the R terminal;
OR
- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the C terminal.

Power Loss/Recovery

Thermostat memory is retained for a minimum of 24 hours during a power loss (includes retention of program information, HOLD status, programmed temperature setpoint, heat/cool and fan mode settings, filter reminder status, maintenance reminder status, and equipment protection timers). After 24 hours of power loss, programmed settings will be lost and replaced with default settings.

IMPORTANT

Power must be applied for at least six consecutive hours prior to a power loss in order for memory to be retained for the specified time.

LCD Backlight

Activated for 30 seconds when any button is pressed.

NOTE - During an electrical storm or similar disturbance, the backlight may activate for a few seconds. This is normal and will no longer occur after the electrical disturbance has passed.

Thermostat Operating Conditions

35°F to 105°F, 5% to 90% RH

Thermostat Storage Conditions

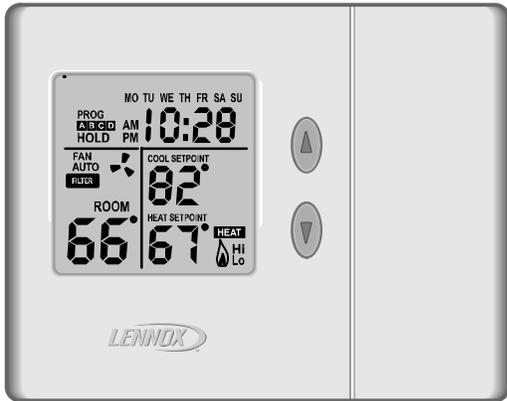
-40°F to 185°F, 5% to 95% RH

Thermostat Output Table

Table 5 depicts the 51M34 thermostat output states for various input conditions.

Table 5

Thermostat Outputs			
Condition	W1	Y1	G
Gas Heat, Auto Fan			
HEAT Demand	X		
COOL Demand		X	X
No Demand			
Gas Heat, Continuous Fan			
HEAT Demand	X		X
COOL Demand		X	X
No Demand			X
Electric Heat, Auto Fan			
HEAT Demand	X		X
COOL Demand		X	X
No Demand			
Electric Heat, Continuous Fan			
HEAT Demand	X		X
COOL Demand		X	X
No Demand			X
<i>NOTE - X = output is activated with 24VAC.</i>			



RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE

51M39 Merit® Series Thermostat

The Lennox Merit® Series 7 day programmable electronic thermostat 51M39 provides excellent temperature control and a large, easy-to-read display. This product includes a programmable filter change reminder, an equipment maintenance reminder, and a system check indicator to notify the user when the equipment requires service.

Thermostat 51M39 is suitable for non-heat pump, two-stage heat/two-stage cool applications using a gas or electric furnace. Also, the thermostat provides autochange-over capability.

General

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

Introduction

This document describes the operation of Lennox thermostat 51M39. Refer to the installation manual for instructions regarding installation and wiring of the thermostat.

Initial Thermostat Power-up

When power is initially applied to the thermostat, the display will appear as shown in figure 1.

OPERATION MANUAL

51M39 Merit® Series 7 Day Programmable Thermostat

CONTROLS
 505,068M
 07/05

Technical Publications
 Litho U.S.A.

Table of Contents

51M39 Series Thermostat	1
General	1
Introduction	1
Initial Thermostat Power-up	1
Buttons, Backlight, Timers & Settings	2
DAY/TIME - Set Day and Time	2
HEAT - Heat Mode	3
COOL - Cool Mode	3
AUTO - Using the Autochangeover Mode	4
HOLD - Temperature Hold Mode	4
PROG - Thermostat Programming	4
COPY - Copy a Program	6
FAN - Controlling Fan Operation	5
Displaying Outside Temperature	6
SETTINGS - Filter /Maintenance Reminder	6
Service Indicator	6
Thermostat RESET	6
Removing/Installing Thermostat	7
Default Thermostat Settings	7
Thermostat Output Table	7
Technical Specifications	8

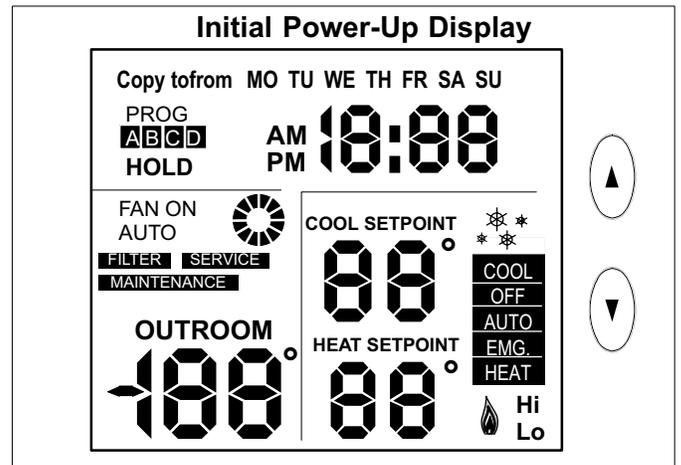


Figure 1

All display segments are momentarily activated. This occurs as a normal part of thermostat initialization.



Within a few seconds, the HOME screen appears (see figure 2) with default settings as shown. After about 1 minute of initialization time, the actual room temperature will be displayed.

NOTE - Tables 2 and 3 on page 7 show all system and programming defaults.

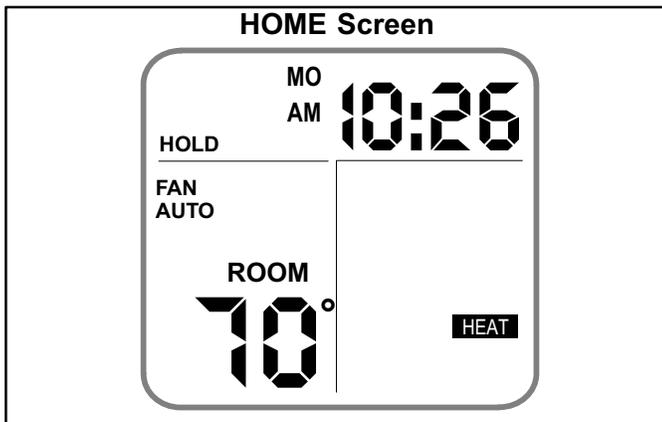


Figure 2

At this point, the thermostat will be fully functional; its default temperature setpoint (not shown) is 70°F. At this point, if the equipment has been fully powered and if a heat demand were present, the system would begin operating.

NOTE - Temperature scale default is Fahrenheit units but may be reset to show Celsius, if desired. See page 8.

Buttons, Backlight, Timers & Settings

Buttons are located behind the small door on the right-hand side of the thermostat (see figure 3).

⚠ IMPORTANT

Do NOT begin pressing buttons until after you read the following section describing each button.

A pale blue display backlight illuminates for 30 seconds each time any button is pressed.

When PROG or DAY/TIME button is pressed, a field begins flashing, expecting another input. Start making changes within 15 seconds or the HOME screen will return.

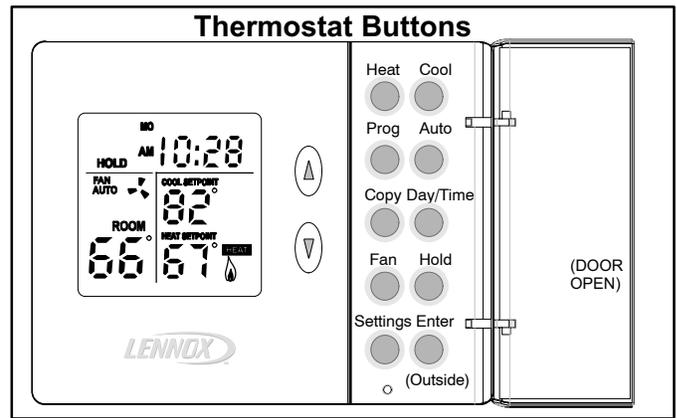


Figure 3

When an Arrow, HOLD, HEAT, or COOL button is pressed, SETPOINT and the temperature setting appears for 15 seconds. If desired, start making changes within 15 seconds or the HOME screen will return. The backlight will turn off 15 seconds after the HOME screen reappears.

DAY/TIME - Setting the Day and Time

Press the DAY/TIME button and set the CURRENT hour, minute, and day of week as follows:

1. "AM12" will flash on the screen. Press the UP/DOWN arrows to change the hour. ("AM" or "PM" must correspond to time of day.) Press DAY/TIME **OR**, if adjusting for daylight savings time, pressing the ENTER button stores the single change and exits to the HOME screen, bypassing minutes and day of week.
2. Minutes will flash. Use the UP/DOWN arrow button to display the minutes past the hour. Press DAY/TIME.
3. Day "MO" (Monday) will flash. Use UP or DOWN arrow buttons to display the current day. Day selections are abbreviated as "MO", "TU", "WE", "TH", "FR", "SA", and "SU". Press DAY/TIME.
4. The HOME screen reappears; confirm day and time are correct. This completes day and time setting.

HEAT - Using the Heat Mode

Enabling and Disabling Heat Mode

The thermostat must be in the heat mode to control the heating equipment. Press the HEAT button to enable or disable HEAT mode. If the thermostat is in cool or off mode, pressing the HEAT button enables the heat mode (indicated by HEAT in the lower right corner - see figure 4).

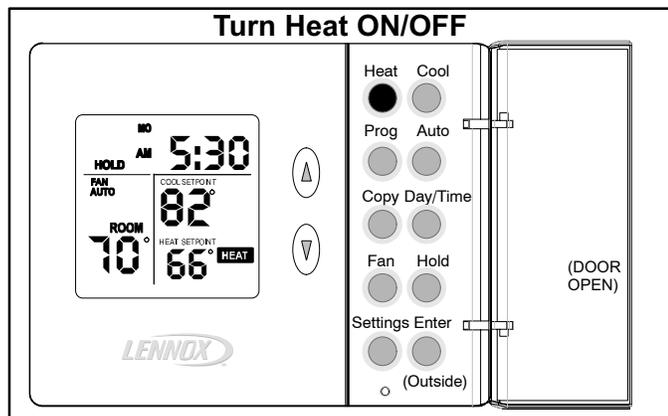


Figure 4

If the thermostat is in heat mode, heat mode is disabled when the HEAT button is pressed. This is indicated by OFF near the right side of the display as shown in figure 5.

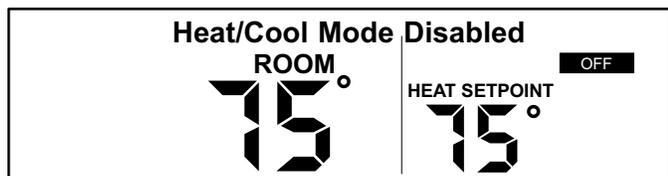


Figure 5

Heating Demand

Set the thermostat to heat mode to control the heating equipment. Then, if the room temperature is lower than the temperature setpoint, as shown in figure 6, the thermostat detects a heating demand and will activate the heating equipment to satisfy the demand.

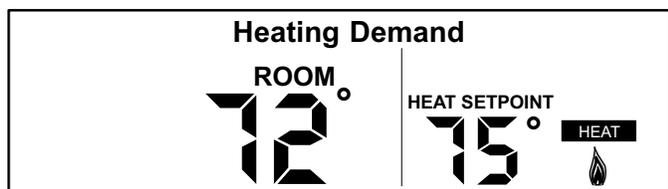


Figure 6

Heating operation is indicated by a flame icon in the lower right corner. When the actual temperature rises above the temperature setpoint, the flame icon will disappear. This indicates that the heating demand has been satisfied and that the heating equipment has been turned off.

If your system supports 2-stage heating (as does the 51M39 thermostat), you may notice various heating levels being delivered during a demand.

NOTE - Heating equipment is activated for at least 3 minutes if no buttons are pressed during the demand interval.

COOL - Using the Cool Mode

Enabling and Disabling Cool Mode

Use the COOL button to enable or disable cool mode as desired. If the thermostat is in heat or off mode, cool mode is enabled when the COOL button is pressed. This is indicated by COOL on the right side of the display (see figure 8).

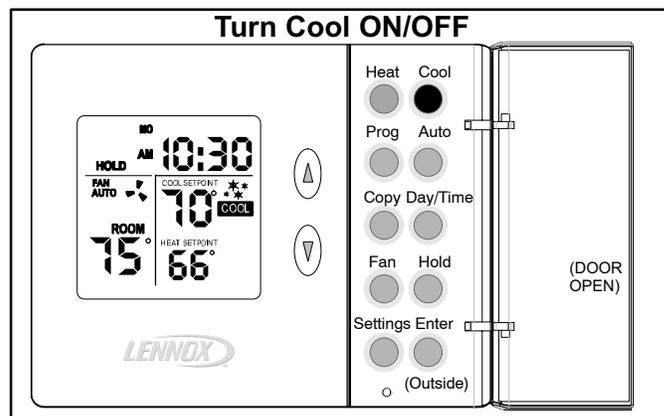


Figure 7

If the thermostat is in cool mode, pressing the COOL button disables cool mode (indicated by OFF in the SYSTEM box - see figure 5).

Cooling Demand

Set the thermostat to cool mode to control the cooling equipment. Then, if the room temperature is higher than the temperature setpoint, as shown in figure 7, the thermostat detects a cooling demand and will activate the cooling equipment to satisfy the demand.

Cooling operation is indicated by flashing "snowflake" icons on the right side of the display. When the actual temperature drops below the temperature setpoint, the snowflake icons will disappear. This indicates that the cooling demand has been satisfied and that the cooling equipment has been turned off.

If your system supports 2-stage cooling (as does the 51M39 thermostat), you may notice various cooling levels being delivered during a demand. Also, if a small cooling demand is present, "Lo" will be displayed in the SYSTEM box. However, if a large cooling demand is present, "Hi" will be displayed in the lower right corner (shown in figure 8).

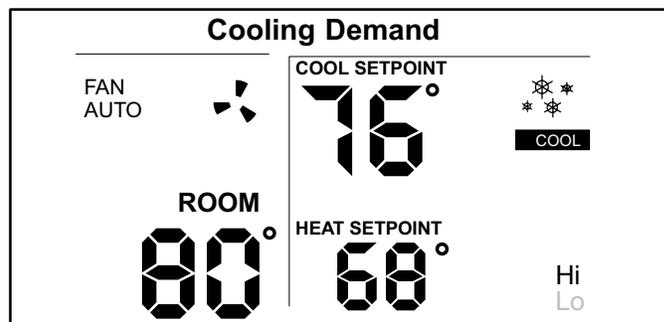


Figure 8

NOTE - If no buttons are pressed during a demand for cooling, the equipment must operate for at least 4 minutes. After a demand has been satisfied, cooling equipment operation is locked out for 5 minutes. If another cooling demand occurs during this 5-minute interval, "COOL" and the snowflakes will flash; however, the cooling equipment will not operate until the 5-minute delay has elapsed.

AUTO - Using the Autochangeover Mode

When in either heat mode or cool mode, autochangeover can be enabled or disabled by pressing the AUTO button. If enabled, AUTO appears at the lower right corner of the display. The thermostat will then automatically change over from heating to cooling and vice versa, to keep the room temperature in between the heating and cooling setpoints. Autochangeover can be used in either of the thermostat hold modes, or when the thermostat program is running. These modes are described later.

HOLD - Using Temperature Hold Modes

When HOLD is displayed at the HOME screen, the thermostat is in a temperature hold condition. This means that the temperature program data is ignored and the thermostat functions much like a non-programmable thermostat.

Adjusting Temperature Setpoint in Hold Mode

The temperature setpoint represents the desired temperature of the space around the thermostat. The default heat setpoint in hold mode is 70°F; the default cool setpoint in hold mode is 78°F.

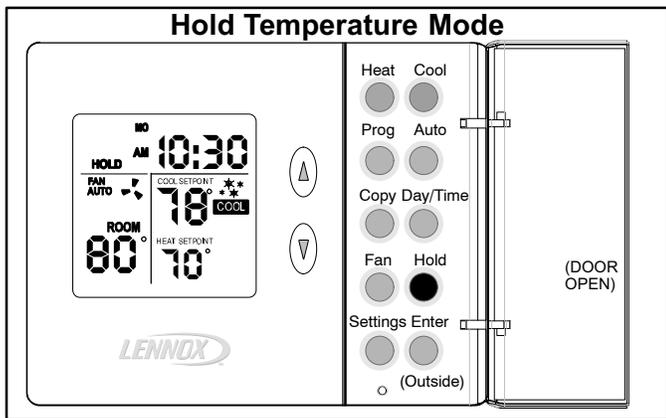


Figure 9

To adjust the setpoint, press the UP or DOWN (▲▼) arrow buttons; the existing setpoint is displayed to the right of the actual room temperature. Each button press adjusts the setpoint up or down by 1 degree.

After the desired setpoint is reached, the HOME screen will reappear after about 15 seconds.

Permanent Hold Mode

At any time the program is running, from the HOME screen, set a permanent hold (program override) by pressing the HOLD button (see figure 9). The thermostat now functions much like a non-programmable thermostat. Use the Up/Down arrow buttons to adjust the hold setpoint. To return to the program, press the HOLD button again.

Temporary (2-Hour) Hold

At any time the program is running, from the HOME screen, set a temporary 2-hour hold by pressing the Up/Down arrow buttons until the desired setpoint is displayed; "HOLD" flashes (see figure 10). This overrides the program for 2 hours from the last button press, then returns to the program.

While in Temporary Hold, press the HOLD button once to switch to Permanent Hold (HOLD displays solid; PROG not displayed); press the HOLD button again to return to the program (PROG displays; HOLD not displayed).

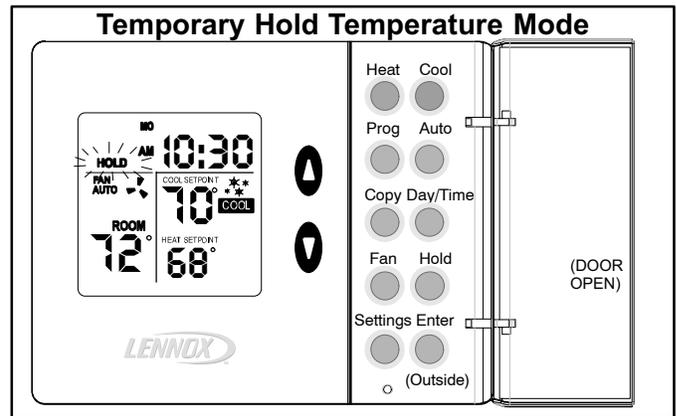


Figure 10

PROG - Thermostat Programming

The 51M39 thermostat can be programmed to perform a set of both heating and cooling events for each day of the week. Each day can be programmed for 4 unique events per day, and each day can be different from any other day.

To Set Program Events and Temperatures

Figure 11 gives an example of how up to 7 different programs can be set. Programs **A** and **C** reflect the desired warmth while the home IS occupied (72°); **B** allows less heating while the home is NOT occupied; **D** reflects a cool sleeping temperature.

NOTE - This example shows heat setpoints; a similar program may be set for cool setpoints.

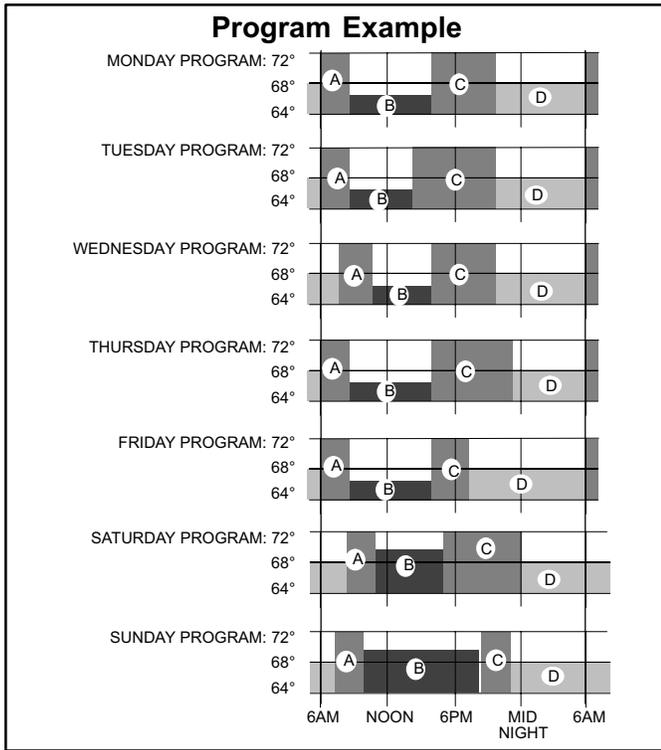


Figure 11

NOTE - Pressing the ENTER button during the following programming steps, saves and exits to the HOME screen. To program events and temperatures, perform the following steps.

1. Press and release the PROG button. "MO" (Monday), "AM 6:00", period "A", "COOL SETPOINT 78", and "HEAT SETPOINT 70" are displayed. "AM 6" flashes.
2. Use the Up/Down arrow buttons to select the desired hour; press the PROG button when the desired hour is reached; use the Up/Down arrow buttons again to select desired minute. The selected hour/minute is when the program will start. Press the PROG button.
3. Use the Up/Down arrow buttons to select the desired heat setpoint; press the PROG button.
4. Use the Up/Down arrow buttons to select the desired cool setpoint; press the PROG button.
5. Repeat steps 1 - 4 for Monday, periods B, C, and D.
6. **COPY A PROGRAM** - If the program entered for Monday is satisfactory for other days of the week, do the following to repeat the same program for other days:
 - A** Press the PROG button, then press the COPY button. The display clears the screen except for "Copy from MO" with "MO" flashing. Press the COPY button again to copy Monday's program.
 - B** The display changes to "Copy to MO". Use the arrow buttons to scroll to the desired day where you want the same program as Monday. Press the COPY button.

C Repeat steps A and B for as many days as you want the same program.

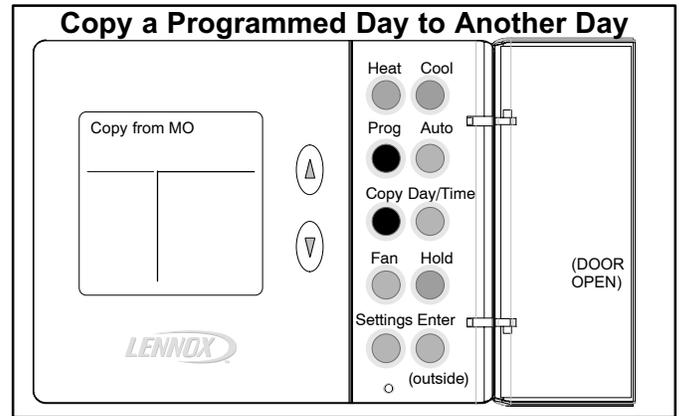


Figure 12

7. Repeat steps 1 - 5 to program different times and temperatures for days not yet programmed.

FAN - Controlling the Fan Operation

Use the FAN button to select either continuous fan mode or auto fan mode.

To change from continuous to auto fan mode (or vice versa), press the FAN button. Note whether a fan icon in the FAN box is present (indicating that the fan is running) or not (fan not running).

If continuous fan mode is enabled (ON displayed in FAN box - see figure 13), the fan will run continuously regardless of whether the heating or cooling equipment is running.

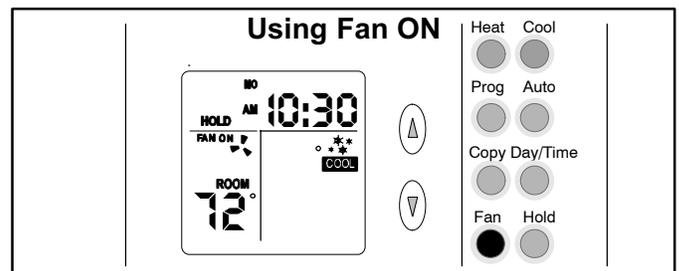


Figure 13

If auto fan mode is selected (AUTO displayed in FAN box - see figure 14), the fan will only run when the heating or cooling equipment is running.

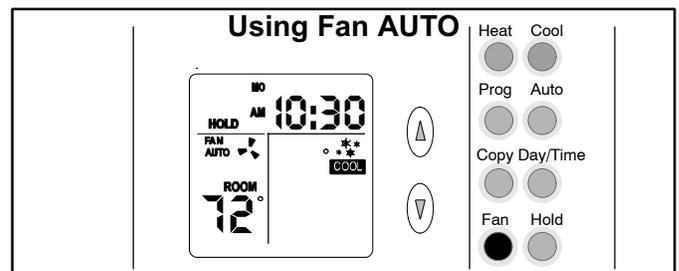


Figure 14

Displaying Outside Temperature

Pressing the ENTER (Outside) button at the HOME screen displays the outside temperature (see figure 15) for several seconds, then returns to room temperature.

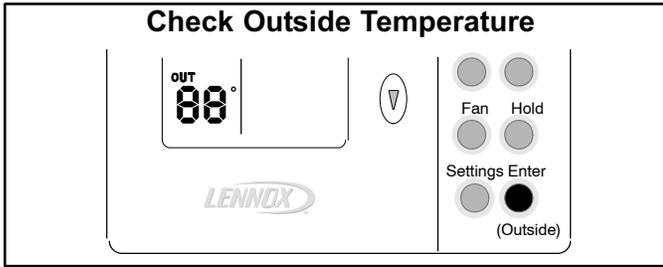


Figure 15

SETTINGS - Filter/Maintenance Reminders

The 51M39 thermostat is designed to remind you when the filter needs changing or when routine maintenance is required, as (and if) defined, by you. These optional reminders are not enabled until you activate them. To do so, press the SETTINGS button once or twice for the desired reminder as shown in figure 16 and as described in table 1.

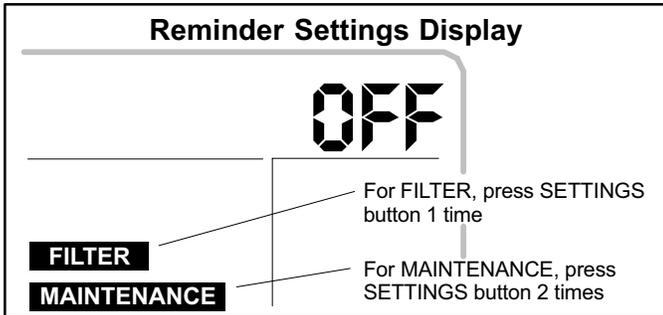


Figure 16

The default setting for the reminders is OFF (disabled). Press Up/Down arrow buttons to select the desired reminder intervals.

Table 1

Filter and Maintenance Reminders		
Buttons to Use	Reminder	Available Settings and How to Use
Settings (1st press) then Arrows to scroll selections	FILTER	Total fan run time expressed in months (Off, 1, 3, 6, 12); for example, if fan runs 12 hours a day, 1 month reminder displays in 2 calendar months.
Settings (2nd press) then Arrows to scroll selections	MAINTENANCE	Elapsed chronological time in months (Off, 6, 12). Use this, for example, to remind yourself when to perform routine checks or when to call a technician for periodic preventive maintenance.
Enter		Stores settings.

NOTE - The HOME screen will reappear about 15 seconds after the final arrow button press. OR, press the ENTER button at any time to store any changes and exit to the HOME screen.

After either programmed interval has elapsed, the reminder will be displayed as shown in figure 17.

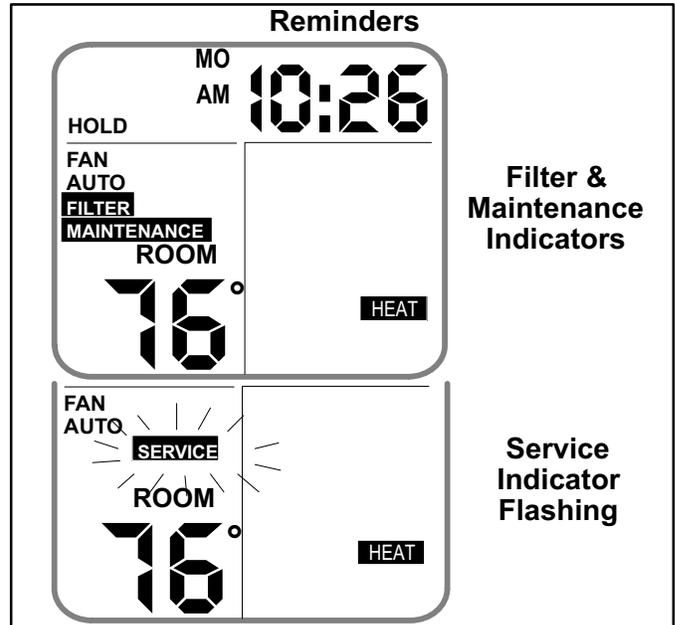


Figure 17

After the filter has been changed or maintenance performed, reset the reminder by pressing the SETTINGS button for 4 seconds at the corresponding reminder settings screen. The screen will blink for a few moments to indicate that the timer has been reset.

Service Indicator

When abnormal equipment operation is detected, the SERVICE indicator will flash on the screen (see figure 17). This indicates that the equipment requires service from a qualified service technician.

Thermostat RESET

Under some abnormal conditions, it may be necessary to “reset” the thermostat to its default condition. Such a RESET would delete all programming and settings and therefore should only be used on rare occasions when the thermostat fails to function as designed and/or as programmed. Such an instance can occur as a result of a power surge or similar electrical disturbance (e.g. after an electrical storm or power outage). The RESET button can be used to recover from this situation.

CAUTION

When the RESET button is pressed, ALL settings revert back to the defaults, including the default program (see tables 2 and 3).

The RESET button is an unlabeled, recessed button located behind the door on the right-hand side of the thermostat, below the SETTINGS button (see figure 3). Use a paper clip or small pencil to press the RESET button; ALL thermostat settings will be reset to the defaults listed in the Default Thermostat Settings section.

Removing and Installing Thermostat

The thermostat hinges on tabs on the top of the subbase; no tool is needed to remove the thermostat from the subbase. Pivot the bottom of the thermostat outward (releasing the snaps), then lift up to remove.

To install it, first position the top tilted toward the wall bracket and align it until you feel the tabs and slots engage; then, while the top is in place, pivot the bottom toward the wall until the thermostat snaps into place.

Default Thermostat Settings

Default thermostat settings are in table 2 and the default program is shown in table 3.

Table 2

Default Thermostat Settings	
Mode	Heat (Perm. Hold)
Heat Setpoint (Perm Hold)	70°F (or 21°C)
Cool Setpoint (Perm Hold)	78°F (or 26°C)
Fan	Auto
Filter Reminder	OFF
Maintenance Reminder	OFF
Equipment Protection Timers	Reset Back to Zero
Autochangeover	OFF

Table 3

Default Program Settings (Time & Temp.)			
Programs	Time	Temp.- Heat	Temp.- Cool
All days - A	6:00am	70°F / 21°C	78°F / 26°C
All days - B	8:00am	62°F / 17°C	85°F / 29°C
All days - C	6:00pm	70°F / 21°C	78°F / 26°C
All days - D	10:00pm	62°F / 17°C	82°F / 28°C

Thermostat Output Table

Table 4 depicts the 51M39 thermostat output states for various input conditions. The following notes described terms used in the table.

Table 4

Thermostat Outputs					
Condition	W1	W2	Y1	Y2	G
Gas Heat, Auto Fan					
Heat Demand, SMALL	X				
Heat Demand, LARGE	X	X			
Cool Demand, SMALL			X		X
Cool Demand, LARGE			X	X	X
No Demand					
Gas Heat, Continuous Fan					
Heat Demand, SMALL	X				X
Heat Demand, LARGE	X	X			X
Cool Demand, SMALL			X		X
Cool Demand, LARGE			X	X	X
No Demand					X
Electric Heat, Auto Fan					
Heat Demand, SMALL	X				X
Heat Demand, LARGE	X	X			X
Cool Demand, SMALL			X		X
Cool Demand, LARGE			X	X	X
No Demand					
Electric Heat, Continuous Fan					
Heat Demand, SMALL	X				X
Heat Demand, LARGE	X	X			X
Cool Demand, SMALL			X		X
Cool Demand, LARGE			X	X	X
No Demand					X

NOTE - X = output is activated with 24VAC.

NOTE - The temperature ranges expressed in the following definitions of "SMALL/LARGE" demands are for guidance only; actual temperatures may vary.

*With a SMALL heat demand, temperature is: below **setpoint -0.5F** but above **setpoint -1.5F** AND 30-minute upstage timer HAS NOT expired.*

*With a LARGE heat demand, temperature is: less than **setpoint -1.5F** OR 30-minute upstage timer HAS expired.*

*With a SMALL cool demand, temperature is: above **setpoint +0.5F** but below **setpoint +1.5F** AND 30-minute upstage timer HAS NOT expired.*

*With a LARGE cool demand, temperature is: above **setpoint +1.5F** OR 30-minute upstage timer HAS expired.*

Technical Specifications

Thermostat Type

Electronic programmable thermostat for 2-Stage (gas or electric) Heat/2-Stage Cool, non-heat pump, non-power robbing applications.

Table 5

51M39 Terminal Designations	
Terminal	Description
R	24VAC
Y1	First-stage cooling
W1	First-stage heating
Y2	Second-stage cooling
W2	Second-stage heating
G	Fan control
L	Service Indicator
C	24VAC common
T	Outdoor temperature sensor connection 1
T	Outdoor temperature sensor connection 2

Power Supply Range

18VAC - 30VAC (24VAC nominal), 60Hz

CAUTION

24VAC is present on the terminals of the thermostat bracket. If removing the thermostat from the wall, use caution and avoid touching any of the connector terminals on the wall bracket.

Also, when working with the thermostat dip switches, use a non-conductive tool and take caution to avoid making any contact with the circuit board, its imprinted circuitry and its connector prongs.

Temperature Display

Display Scale: Fahrenheit or Celsius user selectable (via DIP switch; see figure 18)

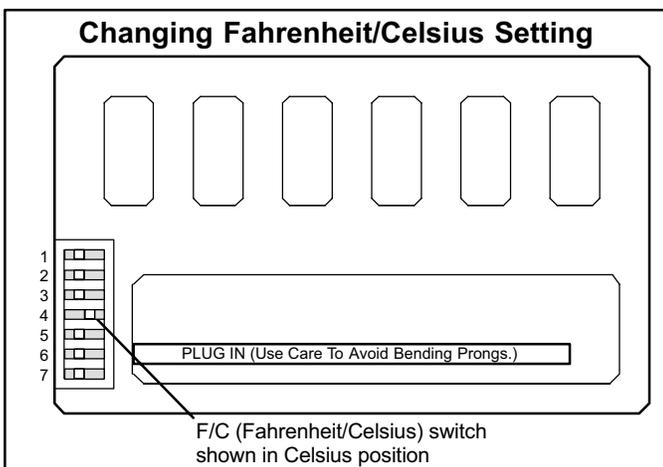


Figure 18

Display range: 35°F (2°C) to 99°F (37°C)

Display resolution: 1°F (1°C)

Display Accuracy: +/-1°F

If the Fahrenheit/Celsius display must be changed, use a plastic, non-conductive tool to push the dip switch to the right position (see figure 18).

Indoor Temperature Measurement Range

Measurement Scale: Fahrenheit

Measurement Range: 35°F to 99°F

Measurement Resolution: 0.5°F

Measurement Accuracy: +/-1°F

Field Offset: via DIP switches to +/-3°F

Sampling Method: temperature measurements sampled every 15 seconds. Displayed temperature is the average of the last four measurements.

Outdoor Temperature Measurement Range

Measurement Scale: Fahrenheit

Measurement Range: -22°F to 122°F

Measurement Resolution: 1°F

Measurement Accuracy: +/-2°F

Temperature Setpoint Range

Setting range: 50°F (10°C) to 90°F (32°C)

Setting resolution: 1°F (1°C)

Smart Setback Recovery (via DIP switch #6)

Smart Setback Recovery (SSR) affects the way the thermostat responds to program events. If SSR is disabled, the thermostat will react to a program event at the time the event occurs. However, if SSR is enabled, the thermostat will react to a program event before the event occurs such that the desired temperature is reached at the time of the event, not after.

Autochangeover Deadband Selection (via DIP switch #7)

Autochangeover deadband can be set to 4 or 6 degrees. When autochangeover is enabled (via the AUTO button), the thermostat will automatically change over from heating to cooling and vice versa, to keep the room temperature in between the heating and cooling setpoints. The deadband is the minimum difference between the heating and cooling setpoints.

Fan Control

AUTO or ON modes, gas or electric heat compatible via DIP switches (also see Thermostat Output section).

I/O Relays

All thermostat relays are latching type to minimize power consumption.

Equipment Protection Timers

Minimum Compressor OFF time: 5 minutes

Minimum Compressor ON time: 4 minutes

Minimum Furnace ON time: 3 minutes

Minimum furnace cycle time (elapsed time between any furnace activation and the next furnace activation): 6 minutes.

Minimum elapsed time between any compressor activation and the next compressor activation: 6 minutes.

NOTE - All protection timers (except the compressor OFF timer) can be over-ridden if a heating or cooling demand is initiated or terminated using the UP, DOWN, HEAT, or COOL buttons.

Equipment Protection Override

Both the minimum compressor OFF timer and the minimum equipment cycle timer can be over-ridden by pressing and holding either the HEAT or COOL button down for 4 seconds.

Over-Temperature Protection

Thermal-mechanical switch opens W1 and W2 at 93°F+/-6°F.

Filter Reminder

Settings of Off, 1, 3, 6 or 12 (months of fan run time) are available. When programmed time has elapsed, a FILTER indicator is displayed.

Maintenance Reminder

Settings of Off, 6 or 12 (months of chronological time) are available. When programmed time has elapsed, a maintenance indicator "MAINTENANCE" is displayed.

Service Reminder

The SERVICE indicator is displayed only under the following conditions:

- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the R terminal;
OR

- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the C terminal.

Power Loss/Recovery

Thermostat memory is retained for a minimum of 24 hours during a power loss (includes retention of clock setting, program information, HOLD status, programmed temperature setpoint, heat/cool and fan mode settings, filter reminder status, maintenance reminder status, and equipment protection timers). After 24 hours of power loss, programmed settings will be lost and replaced with default settings.

⚠ IMPORTANT

Power must be applied for at least six consecutive hours prior to a power loss in order for memory to be retained for the specified time.

LCD Backlight

Activated for 30 seconds when any button is pressed.

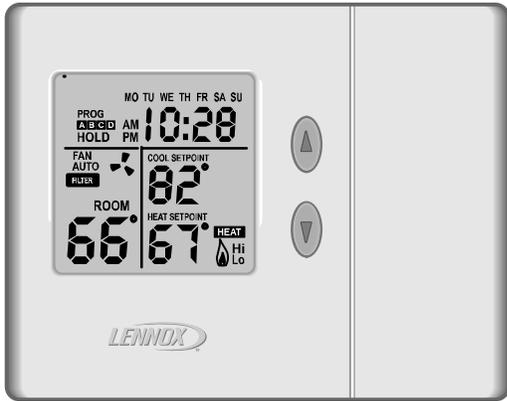
NOTE - During an electrical storm or similar disturbance, the backlight may activate for a few seconds. This is normal and will no longer occur after the electrical disturbance has passed.

Thermostat Operating Conditions

35°F to 105°F, 5% to 90% RH

Thermostat Storage Conditions

-40°F to 185°F, 5% to 95% RH



**RETAIN THESE INSTRUCTIONS
 FOR FUTURE REFERENCE**

51M42 Merit® Series Thermostat

The Lennox Merit® Series 7-day programmable electronic thermostat 51M42 provides excellent temperature control and a large, easy-to-read display. It includes a programmable filter change reminder, an equipment maintenance reminder, and a system check indicator to notify the user when the equipment requires service.

Thermostat 51M42 is suitable for heat pump, three-stage heat/two-stage cool applications using a gas or electric auxiliary heat source. In addition to displaying outdoor temperature, the outdoor temperature sensor provides auxiliary heat lockout, balance point operation, and dual-fuel compatibility. Also, the thermostat provides auto-changeover capability.

General

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

Introduction

This document describes the operation of Lennox thermostat 51M42. Refer to the installation manual for instructions regarding installation and wiring of the thermostat.

Initial Thermostat Power-up

When power is initially applied to the thermostat, the display will appear as shown in figure 1.

OPERATION MANUAL

51M42 Merit® Series

7-Day Programmable Thermostat

CONTROLS
 505,069M
 07/05

Technical Publications
 Litho U.S.A.

Table of Contents

51M42 Series Thermostat	1
General	1
Introduction	1
Initial Thermostat Power-up	1
Buttons, Backlight, Timers & Settings	2
DAY/TIME - Set Day and Time	2
HEAT - Heat Mode	3
COOL - Cool Mode	4
AUTO - Using the Autochangeover Mode	4
HOLD - Temperature Hold Mode	4
PROG - Thermostat Programming	5
COPY - Copy a Program	5
FAN - Controlling Fan Operation	6
Displaying Outside Temperature	6
SETTINGS - Filter and Maintenance Reminders	6
SETTINGS - Balance Point	7
Service Indicator	7
Thermostat RESET	7
Removing/Installing Thermostat	7
Default Thermostat Settings	7
Technical Specifications	9
Thermostat Output Table	8

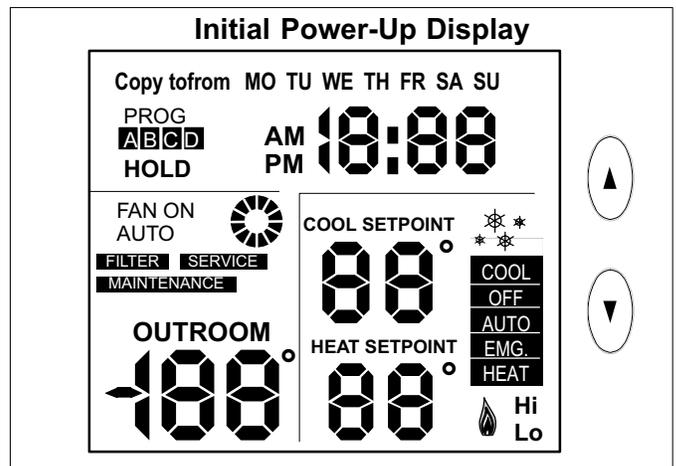


Figure 1

All display segments are momentarily activated. This occurs as a normal part of thermostat initialization.



Within a few seconds, the HOME screen appears (see figure 2) with default settings as shown. After about 1 minute of initialization time, the actual room temperature will be displayed.

NOTE - Tables 2 and 3 on page 8 show all system and programming defaults.

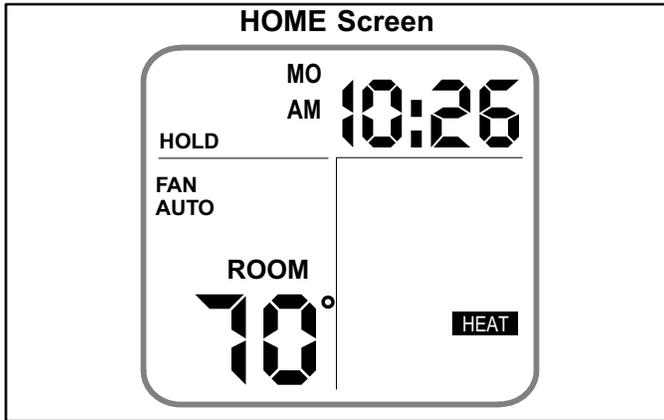


Figure 2

At this point, the thermostat will be fully functional; its default temperature setpoint (not shown) is 70°F. At this point, if the equipment has been fully powered and if a heat demand were present, the system would begin operating.

NOTE - Temperature scale default is Fahrenheit units but may be reset to show Celsius, if desired. See page 9.

Buttons, Backlight, Timers & Settings

Buttons are located behind the small door on the right-hand side of the thermostat (see figure 3).

⚠ IMPORTANT

Do NOT begin pressing buttons until after you read the following section describing each button.

A pale blue display backlight illuminates for 30 seconds each time any button is pressed.

When PROG or DAY/TIME button is pressed, a field begins flashing, expecting another input. Start making changes within 15 seconds or the HOME screen will return.

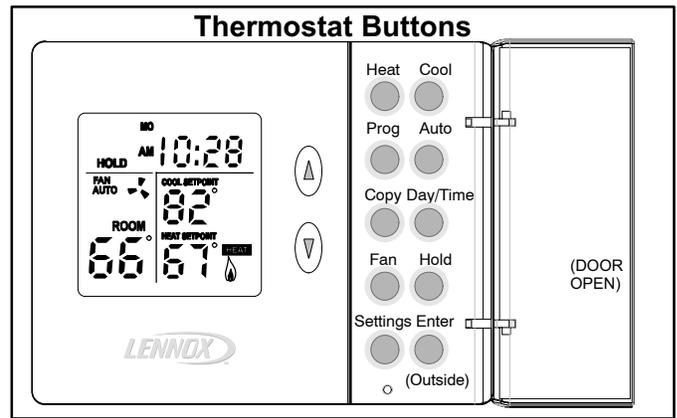


Figure 3

When an Arrow, HOLD, HEAT, or COOL button is pressed, SETPOINT and the temperature setting appears for 15 seconds. If desired, start making changes within 15 seconds or the HOME screen will return. The backlight will turn off 15 seconds after the HOME screen reappears.

DAY/TIME - Setting the Day and Time

Press the DAY/TIME button and set the CURRENT hour, minute, and day of week as follows:

1. "AM12" will flash on the screen. Press the Up/Down arrows buttons to change the hour. ("AM" or "PM" must correspond to time of day.) Press DAY/TIME **OR**, if adjusting for daylight savings time, pressing the ENTER button stores the single change and exits to the HOME screen, bypassing minutes and day of week.
2. Minutes will flash. Use the Up/Down arrow buttons to display the minutes past the hour. Press DAY/TIME.
3. Day "MO" (Monday) will flash. Use Up/Down arrow buttons to display the current day. Day selections are abbreviated as "MO", "TU", "WE", "TH", "FR", "SA", and "SU". Press DAY/TIME.
4. The HOME screen reappears; confirm day and time are correct. This completes day and time setting.

HEAT - Using the Heat Mode

Normal Heat Mode

In normal heat mode, both the heat pump and the backup heat source are used to provide heat. If the thermostat detects that the heat pump is not able to provide enough heat (as may be the case in very cold weather), then the backup heat source is activated.

Emergency Heat Mode

In emergency heat mode, only the backup heat source provides heat—the heat pump is disabled. The backup heat source is activated only when there is a heat demand.

Enabling Normal Heat Mode

Use the HEAT button to select normal heat mode, emergency heat mode, or to disable heat modes as desired. If the thermostat is in off or cool mode, pressing the HEAT button enables heat mode. This is indicated by HEAT in the lower right corner (see figure 4).

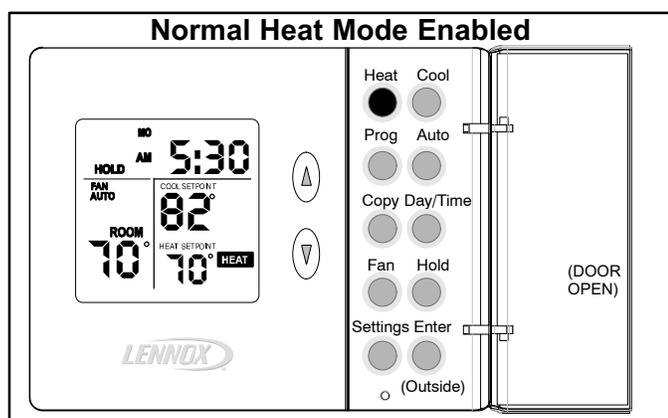


Figure 4

Enabling Emergency Heat Mode

If the thermostat is in heat mode, pressing the HEAT button enables emergency heat mode (see figure 5). If the thermostat is in normal heat mode when the HEAT button is pressed, then emergency heat mode is enabled.

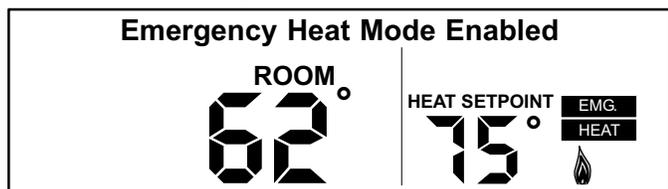


Figure 5

Disabling Heat Mode

If the thermostat is in emergency heat mode when the HEAT button is pressed, then heat modes are disabled. This is indicated by OFF near the right side of the display as shown in figure 6.

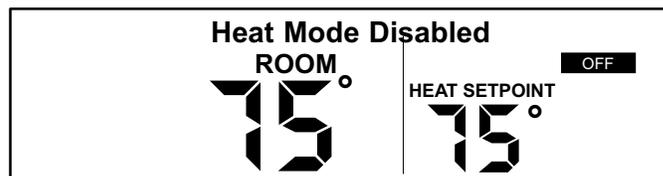


Figure 6

Heating Demand

The thermostat must be in either normal or emergency heat mode in order to properly control the heating equipment. In either heat mode, when the actual temperature is lower than the temperature setpoint (as shown in figure 7), the thermostat detects a heating demand and activates the heating equipment to satisfy the demand. Heating operation is indicated by a flame icon in bottom right-hand corner of the display.

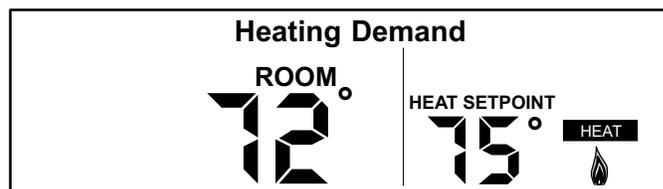


Figure 7

When the actual temperature rises above the temperature setpoint, the flame icon will disappear. This indicates that the heating demand has been satisfied and that the heating equipment has been turned off.

Heat pump operation is locked out for 5 minutes after a demand has been satisfied. If another heat pump demand occurs during this 5-minute interval, the flame icon will flash; however, the heat pump will not run until the 5-minute delay has elapsed.

NOTE - The heat pump is activated for at least 4 minutes if no buttons are pressed during the demand interval. The backup heat source is activated for at least 3 minutes if no buttons are pressed during the demand interval.

If your system supports 3-stage heating (as does the 51M42 thermostat), you may notice various heating levels being delivered during a demand.

If a small heat pump heating demand is present, "Lo" is displayed in the SYSTEM box; if a large heat pump heating demand is present, "Hi" is displayed (see figure 8).

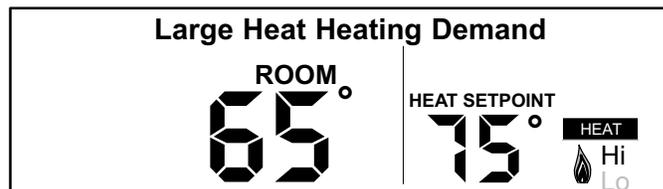


Figure 8

COOL - Using the Cool Mode

Enabling and Disabling Cool Mode

Use the COOL button to enable or disable cool mode as desired. If the thermostat is in heat or off mode, cool mode is enabled when the COOL button is pressed. This is indicated by COOL on the right side of the display (see figure 9).

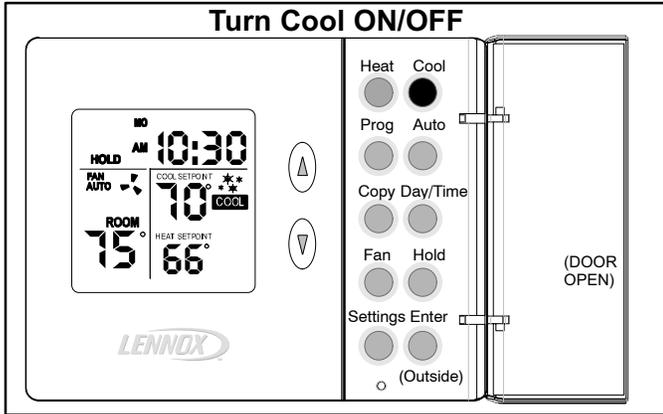


Figure 9

If the thermostat is in cool mode, pressing the COOL button disables cool mode (indicated by OFF on the right side of the display).

Cooling Demand

Set the thermostat to cool mode to control the cooling equipment. Then, if the room temperature is higher than the temperature setpoint, as shown in figure 10, the thermostat detects a cooling demand and will activate the cooling equipment to satisfy the demand.

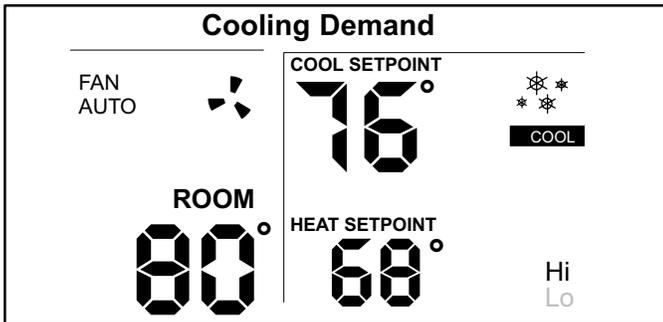


Figure 10

Cooling operation is indicated by flashing "snowflake" icons. When the actual temperature drops below the temperature setpoint, the snowflake icons will disappear. This indicates that the cooling demand has been satisfied and that the cooling equipment has been turned off.

If your system supports 2-stage cooling (as does the 51M42 thermostat), you may notice various cooling levels being delivered during a demand. Also, if a small cooling demand is present, "Lo" will be displayed in the SYSTEM box. However, if a large cooling demand is present, "Hi" will be displayed in the lower right side of the display (shown in figure 10).

NOTE - If no buttons are pressed during a demand for cooling, the equipment must operate for at least 4 minutes. After a demand has been satisfied, cooling equipment operation is locked out for 5 minutes. If another cooling demand occurs during this 5-minute interval, "COOL" and the snowflakes will flash; however, the cooling equipment will not operate until the 5-minute delay has elapsed.

AUTO - Using the Autochangeover Mode

When in either heat mode or cool mode, autochangeover can be enabled or disabled by pressing the AUTO button. If enabled, AUTO appears at the lower right corner of the display. The thermostat will then automatically change over from heating to cooling and vice versa, to keep the room temperature in between the heating and cooling setpoints. Autochangeover can be used in either of the thermostat hold modes, or when the thermostat program is running. These modes are described later.

HOLD - Using Temperature Hold Modes

When the HOLD button is displayed at the HOME screen, the thermostat is in a temperature hold condition. This means that the temperature program data is ignored and the thermostat functions much like a non-programmable thermostat.

Adjusting Temperature Setpoint in Hold Mode

The temperature setpoint represents the desired temperature of the space around the thermostat. The default heat setpoint in hold mode is 70°F; the default cool setpoint in hold mode is 78°F.

To adjust the setpoint, press the UP or DOWN (▲▼) arrow buttons (see figure 11); the existing setpoint is displayed to the right of the actual room temperature. Each button press adjusts the setpoint up or down by 1 degree.

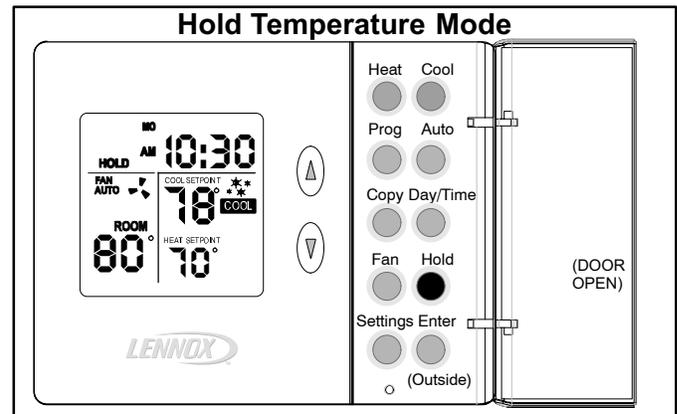


Figure 11

After the desired setpoint is reached, the HOME screen will reappear after about 15 seconds.

Permanent Hold Mode

At any time the program is running, from the HOME screen, set a permanent hold (program override) by pressing the HOLD button (see figure 11). The thermostat now functions much like a non-programmable thermostat. Use the Up/Down arrow buttons to adjust the hold setpoint. To return to the program, press the HOLD button again.

Temporary (2-Hour) Hold

At any time the program is running, from the HOME screen, set a temporary 2-hour hold by pressing the Up/Down arrow buttons until the desired setpoint is displayed; "HOLD" flashes (see figure 12). This overrides the program for 2 hours from the last button press, then returns to the program.

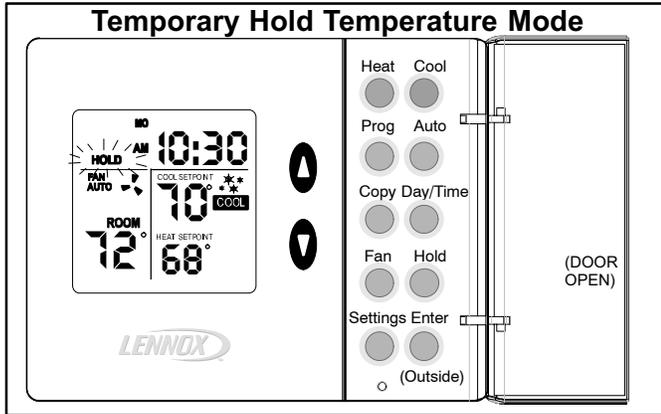


Figure 12

While in Temporary Hold, press the HOLD button once to switch to Permanent Hold (HOLD displays solid; PROG not displayed); press the HOLD button again to return to the program (PROG displays; HOLD not displayed).

PROG - Thermostat Programming

The 51M42 thermostat can be programmed to perform a set of both heating and cooling events for each day of the week. Each day can be programmed for 4 unique events per day, and each day can be different from any other day.

To Set Program Events and Temperatures

Figure 13 gives an example of how up to 7 different programs can be set. Programs **A** and **C** reflect the desired warmth while the home IS occupied (72°); **B** allows less heating while the home is NOT occupied; **D** reflects a cool sleeping temperature.

NOTE - The example in figure 13 shows heat setpoints; a similar program may be set for cool setpoints.

1. Press and release the PROG button. "MO" (Monday), "AM 6:00", period "A", "COOL SETPOINT 78", and "HEAT SETPOINT 70" are displayed. "AM 6" flashes.
2. Use the Up/Down arrow buttons to select the desired hour; press the PROG button when the desired hour is reached; use the Up/Down arrow buttons again to select desired minute. The selected hour/minute is when the program will start. Press the PROG button.
3. Use the Up/Down arrow buttons to select the desired heat setpoint; press the PROG button.
4. Use the Up/Down arrow buttons to select the desired cool setpoint; press the PROG button.

NOTE - Pressing the ENTER button during the following programming steps, saves and exits to the HOME screen.

To program events and temperatures, perform the following steps.

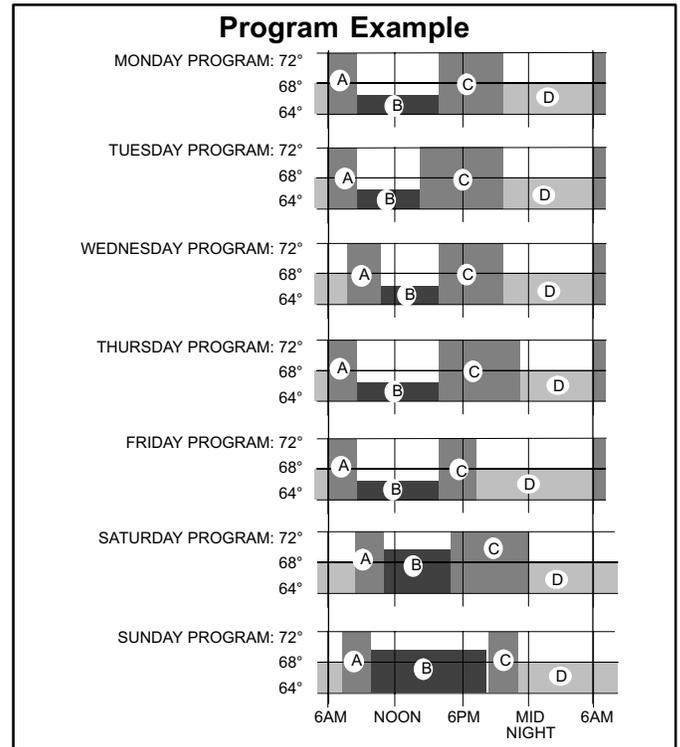


Figure 13

5. Repeat steps 1 - 4 for Monday, periods B, C, and D.
6. **COPY A PROGRAM** - If the program entered for Monday is satisfactory for other days of the week, do the following to repeat the same program for other days:
 - A Press the PROG button, then press the COPY button. The display clears the screen except for "Copy from MO" with "MO" flashing. Press the COPY button again to copy Monday's program.
 - B The display changes to "Copy to MO". Use the arrow buttons to scroll to the desired day where you want the same program as Monday. Press the COPY button.
 - C Repeat steps A and B for as many days as you want the same program.

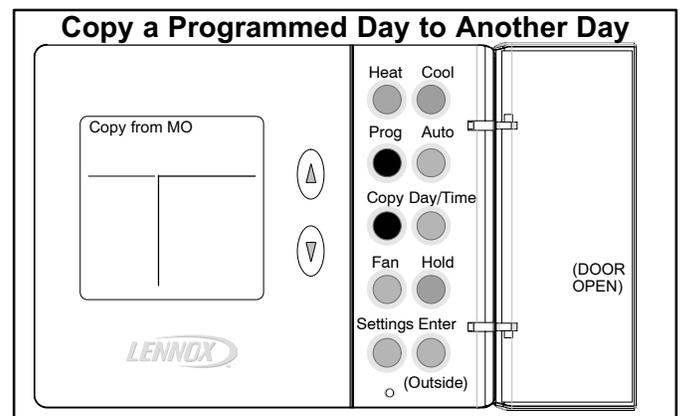


Figure 14

7. Repeat steps 1 - 5 to program different times and temperatures for days not yet programmed.

FAN - Controlling the Fan Operation

Use the FAN button to select either continuous fan mode or auto fan mode.

To change from continuous to auto fan mode (or vice versa), press the FAN button. Note whether a fan icon in the FAN box is present (indicating that the fan is running) or not (fan not running).

If continuous fan mode is enabled (ON displayed in FAN box - see figure 15), the fan will run continuously regardless of whether the heating or cooling equipment is running.

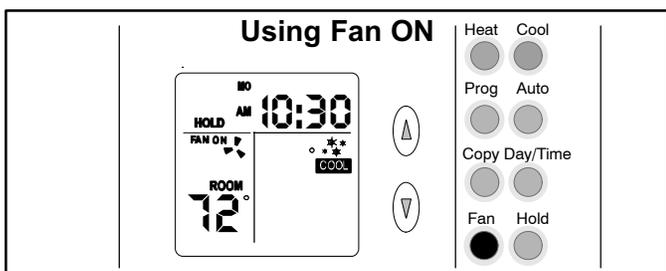


Figure 15

If auto fan mode is selected (AUTO displayed in FAN box - see figure 16), the fan will only run when the heating or cooling equipment is running.

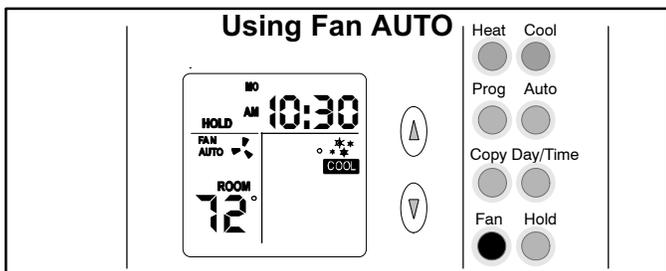


Figure 16

Displaying Outside Temperature

Pressing the ENTER (Outside) button at the HOME screen displays the outside temperature (see figure 17) for several seconds, then returns to room temperature.

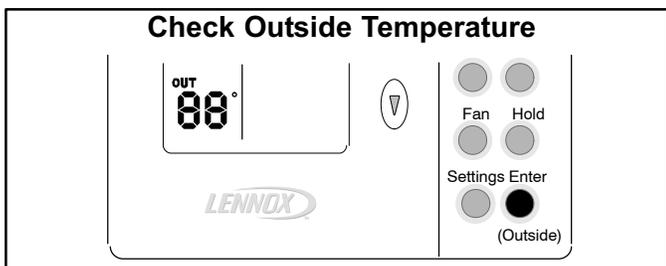


Figure 17

SETTINGS - Filter/Maintenance Reminders

The 51M42 thermostat is designed to remind you when the filter needs changing or when routine maintenance is required, as (and if) defined, by you. These optional reminders are not enabled until you activate them. To do so, press the SETTINGS button (shown below the FAN button in figure 16) once or twice for the desired reminder as shown in figure 18 and as described in table 1.

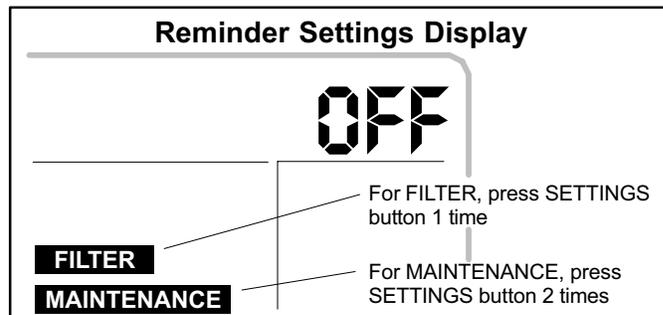


Figure 18

The default setting for the reminders is OFF (disabled). Press Up/Down arrow buttons to select the desired reminder intervals.

Table 1

Filter and Maintenance Reminders		
Buttons to Use	Reminder	Available Settings and How to Use
Settings (1st press) then Arrows to scroll selections	FILTER	Total fan run time expressed in months (Off, 1, 3, 6, 12); for example, if fan runs 12 hours a day, 1 month reminder displays in 2 calendar months.
Settings (2nd press) then Arrows to scroll selections	MAINTENANCE	Elapsed chronological time in months (Off, 6, 12). Use this, for example, to remind yourself when to perform routine checks or when to call a technician for periodic preventive maintenance.
Enter		Stores settings.

NOTE - The HOME screen will reappear about 15 seconds after the final arrow button press. OR, press the ENTER button at any time to store any changes and exit to the HOME screen.

After either programmed interval has elapsed, the reminder will be displayed as shown in figure 19.

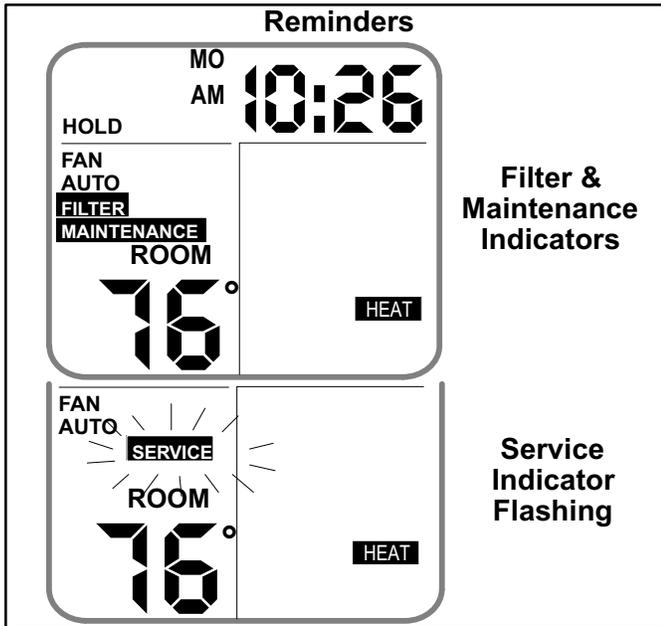


Figure 19

After the filter has been changed or maintenance performed, reset the reminder by pressing the SETTINGS button for 4 seconds at the corresponding reminder settings screen. The screen will blink for a few moments to indicate that the timer has been reset.

SETTINGS - Balance Point

NOTE - The balance point is only available with the outdoor sensor.

When the outdoor sensor (X2658) is connected to the 51M42 thermostat, balance point adjustment is available. The balance point feature allows the measured outdoor temperature to govern operation of the heat pump and backup heat source.

Press the SETTINGS button three times to access the Balance Point Settings screen (see figure 20).

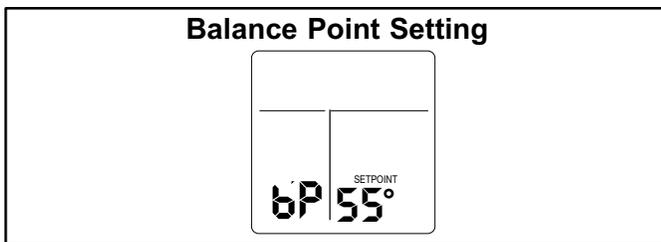


Figure 20

The balance point can be set at any temperature between 1°F and 55°F (-17°C to 13°C). A balance point setting of zero disables the balance point function (in this case, the thermostat behaves as if no outdoor sensor is attached). The default balance point setting is 55°F.

To adjust the balance point up or down, press the Up/Down arrow buttons to the right of the display screen. The balance point setting increases by 1°F each time the Up button is pressed and decreases by 1°F each time the Down button is pressed. After the desired balance point setting is reached, the HOME screen will reappear after about 15 seconds.

NOTE - The balance point feature allows the outdoor temperature to rise or fall 3°F above or below the balance point. This prevents excessive cycling of the equipment when the outdoor temperature is near the balance point. For example, if the balance point is 40°F and the actual outdoor temperature is 35°F, the outdoor temperature must rise to 43°F before equipment adjustment occurs. Conversely, if the balance point is 40°F and the actual outdoor temperature is 45°F, the outdoor temperature must drop to 37°F before equipment adjustment occurs.

Service Indicator

When abnormal equipment operation is detected, the SERVICE indicator will flash on the screen (see figure 19 on page 7). This indicates that the equipment requires service from a qualified service technician.

Thermostat RESET

Under some abnormal conditions, it may be necessary to “reset” the thermostat to its default condition. Such a RESET would delete all programming and settings and therefore should only be used on rare occasions when the thermostat fails to function as designed and/or as programmed. Such an instance can occur as a result of a power surge or similar electrical disturbance (e.g. after an electrical storm or power outage). The RESET button can be used to recover from this situation.

CAUTION

When the RESET button is pressed, ALL settings revert back to the defaults, including the default program (see tables 2 and 3).

The RESET button is an unlabeled, recessed button located behind the door, on the right-hand side of the thermostat, below the SETTINGS button (see figure 3). Use a paper clip or small pencil to press the RESET button; ALL thermostat settings will be reset to the defaults listed in the Default Thermostat Settings section.

Removing/Installing Thermostat

The thermostat hinges on tabs on the top of the subbase; no tool is needed to remove the thermostat from the subbase. Pivot the bottom of the thermostat outward (releasing the snaps), then lift up to remove.

To replace it, first position the top tilted toward the wall bracket and align it until you feel the tabs and slots engage; then, while the top is in place, pivot the bottom toward the wall until the thermostat snaps into place.

Default Thermostat Settings

Default thermostat settings are shown in table 2 and the default program is shown in table 3.

Table 2

Default Thermostat Settings	
Mode	Heat (Perm. Hold)
Heat Setpoint (Perm Hold)	70°F (or 21°C)
Cool Setpoint (Perm Hold)	78°F (or 26°C)
Fan	Auto
Filter Reminder	OFF
Maintenance Reminder	OFF
Equipment Protection Timers	Reset Back to Zero
Autochangeover	OFF

Table 3

Default Program Settings - Time & Temp.			
Programs	Time	Temp. - Heat	Temp. - Cool
All days - A	6:00am	70°F / 21°C	78°F / 26°C
All days - B	8:00am	62°F / 17°C	85°F / 29°C
All days - C	6:00pm	70°F / 21°C	78°F / 26°C
All days - D	10:00pm	62°F / 17°C	82°F / 28°C

Thermostat Output Table

Table 4 depicts the 51M42 thermostat output states for various input conditions. The following notes described terms used in the table.

NOTES:

- X = output is activated with 24VAC.
- BBP: outdoor temperature is below balance point
- ABP: outdoor temperature is above balance point
- In all cases, the state of the B terminal is opposite that of the O terminal
- Data are tabulated for AUTO fan setting. If the fan setting is ON, the G output is activated in all cases
- Upstage timers:
 - 30 minutes (when upstaging from small to large demand)
 - 15 minutes (HEAT MODE ONLY - when upstaging from large to very large demand)
- The temperature ranges expressed in the following definitions of "SMALL/LARGE/VERY LARGE" demands are for guidance only; actual temperatures may vary:
 - With a SMALL heat demand, temperature is: below **setpoint -0.5F** but above **setpoint -1.5F** **AND** 30-minute upstage timer HAS NOT expired.
 - With a LARGE heat demand, temperature is: less than **setpoint -1.5F** **OR** 30-minute upstage timer HAS expired.

With a VERY LARGE heat demand, temperature is: below **setpoint -2.5F** **OR** 15-minute 2nd upstage timer HAS expired.

Emergency heat demand (only if emergency heat is enabled): temperature is below **setpoint -0.5F**.

With a SMALL cool demand, temperature is: above **setpoint +0.5F** but below **setpoint +1.5F** **AND** 30-minute upstage timer HAS NOT expired.

With a LARGE cool demand, temperature is: above **setpoint +1.5F** **OR** 30-minute upstage timer HAS expired.

Table 4

THERMOSTAT OUTPUTS						
Demand Condition	W1	E	Y1	Y2	G	O
Cooling Demands						
SMALL			X		X	X
LARGE			X	X	X	X
No Demand						X
Heating Demands						
With Electric Backup (no outdoor sensor)						
SMALL			X		X	
LARGE			X	X	X	
VERY LARGE	X		X	X	X	
Emergency		X			X	
No Demand						
With Gas Backup (dual fuel; no outdoor sensor)						
SMALL			X		X	
LARGE			X	X	X	
VERY LARGE	X					
Emergency		X				
No Demand						
With Electric Backup (outdoor sensor attached)						
SMALL (Above Balance Point)			X		X	
LARGE (ABP)			X	X	X	
VERY LARGE (ABP)			X	X	X	
SMALL (Below Balance Point)			X		X	
LARGE (BBP)			X	X	X	
VERY LARGE (BBP)	X		X	X	X	
Emergency		X			X	
No Demand						
With Gas Backup (dual fuel; outdoor sensor attached)						
SMALL (ABP)			X		X	
LARGE (ABP)			X	X	X	
VERY LARGE (ABP)	X					
SMALL (BBP)	X					
LARGE (BBP)	X					
VERY LARGE (BBP)	X					
Emergency		X				
No Demand						

Technical Specifications

Thermostat Type

Electronic programmable thermostat for heat pump, 3-stage heat/2-stage cool.

NOTE - 2 stages of heat pump heat and one stage of auxiliary (gas or electric) backup heat are supported.

Power Supply Range

18VAC - 30VAC (24VAC nominal), 60Hz

⚠ CAUTION

24VAC is present on the terminals of the thermostat bracket. If removing the thermostat from the wall, use caution and avoid touching any of the connector terminals on the wall bracket.

Also, when working with the thermostat dip switches, use a non-conductive tool and take caution to avoid making any contact with the circuit board, its imprinted circuitry and its connector prongs.

Temperature Display

Display Scale: Fahrenheit or Celsius user selectable (via DIP switch; see figure 21)

Display range: 35°F (2°C) to 99°F (37°C)

Display resolution: 1°F (1°C)

Display Accuracy: +/-1°F

If the Fahrenheit/Celsius display must be changed, use a plastic, non-conductive tool to push the dip switch to the right position (see figure 21).

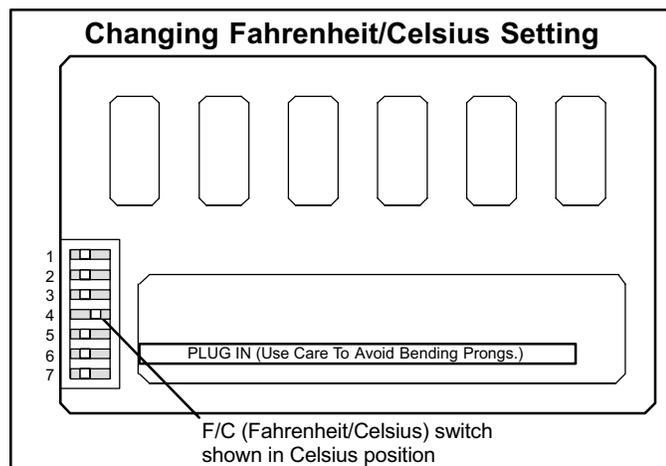


Figure 21

Indoor Temperature Measurement Range

Measurement Scale: Fahrenheit

Measurement Range: 35°F to 99°F

Measurement Resolution: 0.5°F

Measurement Accuracy: +/-1°F

Field Offset: via DIP switches to +/-3°F

Sampling Method: temperature measurements sampled every 15 seconds. Displayed temperature is the average of the last four measurements.

Outdoor Temperature Measurement Range

Measurement Scale: Fahrenheit

Measurement Range: -22°F to 122°F

Measurement Resolution: 1°F

Measurement Accuracy: +/-2°F

Temperature Setpoint Range

Setting range: 50°F (10°C) to 90°F (32°C)

Setting resolution: 1°F (1°C)

Smart Setback Recovery (via DIP switch #6)

Smart Setback Recovery (SSR) affects the way the thermostat responds to program events. If SSR is disabled, the thermostat will react to a program event at the time the event occurs. However, if SSR is enabled, the thermostat will react to a program event before the event occurs such that the desired temperature is reached at the time of the event, not after.

Autochangeover Deadband Selection (via DIP switch #7)

Autochangeover deadband can be set to 4 or 6 degrees. When autochangeover is enabled (via the AUTO button), the thermostat will automatically change over from heating to cooling and vice versa, to keep the room temperature in between the heating and cooling setpoints. The deadband is the minimum difference between the heating and cooling setpoints.

Fan Control

AUTO or ON modes.

I/O Relays

All thermostat relays are latching type to minimize power consumption.

Table 5

51M42 Terminal Designations	
Term.	Description
B	Reversing valve, heat active
O	Reversing valve, cool active
R	24VAC
Y1	First-stage cooling/heating, compressor energized
W1*	Auxiliary heating, furnace energized
Y2	Second-stage cooling/heating, compressor energized
E*	Emergency heat
G	Fan control
L	Service Indicator
C	24VAC common
T	Outdoor temperature sensor connection 1
T	Outdoor temperature sensor connection 2
<p><i>* For most applications, E will be jumpered to W1. If separate wires are not provided for both E and W1, jumper the E terminal to the W1 terminal on the thermostat sub-base. For applications involving the use of a balance point (whereby the outdoor temperature is to be used to restrict either heat pump operation or backup heat source operation), the outdoor sensor (part number X2658) MUST be installed.</i></p>	

Equipment Protection Timers

Minimum Compressor OFF time: 5 minutes
 Minimum Compressor ON time: 4 minutes
 Minimum Furnace ON time: 3 minutes

Minimum furnace cycle time (elapsed time between any furnace activation and the next furnace activation): 6 minutes.

Minimum elapsed time between any compressor activation and the next compressor activation: 6 minutes.

NOTE - All protection timers (except the compressor OFF timer) can be over-ridden if a heating or cooling demand is initiated or terminated using the UP, DOWN, HEAT, or COOL buttons.

Equipment Protection Override

Both the minimum compressor OFF timer and the minimum equipment cycle timer can be over-ridden by pressing and holding either the HEAT or COOL button down for 4 seconds.

Over-Temperature Protection

Thermal-mechanical switch opens W1, Y1, Y2, and E at 93°F+/-6°F.

Filter Reminder

Settings of Off, 1, 3, 6 or 12 (months of fan run time) are available. When programmed time has elapsed, a FILTER indicator is displayed.

Maintenance Reminder

Settings of Off, 6 or 12 (months of chronological time) are available. When programmed time has elapsed, a maintenance indicator "MAINTENANCE" is displayed.

Service Reminder

The SERVICE indicator is displayed only under the following conditions:

- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the R terminal;
 OR
- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the C terminal.

Power Loss/Recovery

Thermostat memory is retained for a minimum of 24 hours during a power loss (includes retention of clock setting, program information, HOLD status, programmed temperature setpoint, heat/cool and fan mode settings, filter reminder status, maintenance reminder status, and equipment protection timers). After 24 hours of power loss, programmed settings will be lost and replaced with default settings.

▲ IMPORTANT

Power must be applied for at least six consecutive hours prior to a power loss in order for memory to be retained for the specified time.

LCD Backlight

Activated for 30 seconds when any button is pressed.

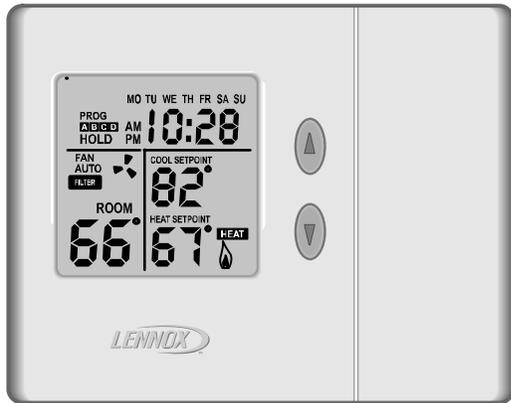
NOTE - During an electrical storm or similar disturbance, the backlight may activate for a few seconds. This is normal and will no longer occur after the electrical disturbance has passed.

Thermostat Operating Conditions

35°F to 105°F, 5% to 90% RH

Thermostat Storage Conditions

-40°F to 185°F, 5% to 95% RH



**RETAIN THESE INSTRUCTIONS
 FOR FUTURE REFERENCE**

51M38 Merit® Series Thermostat

The Lennox Merit® Series 7 day programmable electronic thermostat 51M38 provides excellent temperature control and a large, easy-to-read display. This product includes a programmable filter change reminder, an equipment maintenance reminder, and a system check indicator to notify the user when the equipment requires service.

Thermostat 51M38 is suitable for non-heat pump, single-stage heat/single-stage cool applications with either gas or electric furnace. Also, the thermostat provides auto-changeover capability.

General

These instructions are intended as a general guide and do not supersede local codes in any way. Consult authorities having jurisdiction before installation.

Check equipment for shipping damage. If you find any damage, immediately contact the last carrier.

Introduction

This document describes the operation of Lennox thermostat 51M38. Refer to the installation manual for instructions regarding installation and wiring of the thermostat.

Initial Thermostat Power-up

When power is initially applied to the thermostat, the display will appear as shown in figure 1.

OPERATION MANUAL

51M38 Merit® Series

7 Day Programmable Thermostat

CONTROLS
 505,067M
 07/05

Technical Publications
 Litho U.S.A.

Table of Contents

51M38 Series Thermostat	1
General	1
Introduction	1
Initial Thermostat Power-up	1
Buttons, Backlight, Timers & Settings	2
DAY/TIME - Set Day and Time	2
HEAT - Heat Mode	3
COOL - Cool Mode	3
AUTO - Using the Autochangeover Mode	3
HOLD - Temperature Hold Mode	4
PROG - Thermostat Programming	4
COPY - Copy a Program	5
FAN - Controlling Fan Operation	5
Displaying Outside Temperature	5
SETTINGS - Filter /Maintenance Reminder	5
Service Indicator	6
Thermostat RESET	6
Removing/Installing Thermostat	6
Default Thermostat Settings	6
Thermostat Output Table	7
Technical Specifications	7

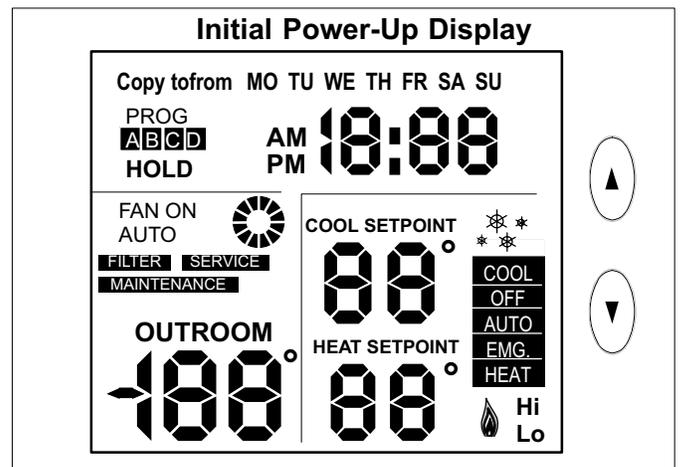


Figure 1

All display segments are momentarily activated. This occurs as a normal part of thermostat initialization.



Within a few seconds, the HOME screen appears (see figure 2) with default settings as shown. After about 1 minute of initialization time, the actual room temperature will be displayed.

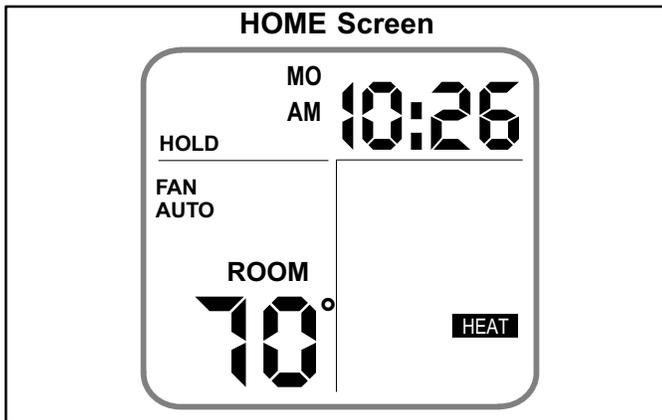


Figure 2

At this point, the thermostat will be fully functional; its default temperature setpoint (not shown) is 70°F. At this point, if the equipment has been fully powered and if a heat demand were present, the system would begin operating.

NOTE - Temperature scale default is Fahrenheit units but may be reset to show Celsius, if desired. See page 7.

Buttons, Backlight, Timers & Settings

Buttons are located behind the small door on the right-hand side of the thermostat (see figure 3).

⚠ IMPORTANT

Do NOT begin pressing buttons until after you read the following section describing each button.

A pale blue display backlight illuminates for 30 seconds each time any button is pressed.

When the PROG or DAY/TIME button is pressed, a field begins flashing, expecting another input. Start making changes within 15 seconds or the HOME screen will return.

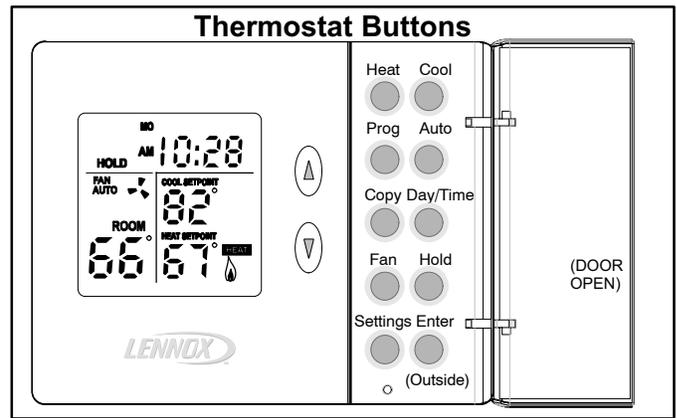


Figure 3

When an Arrow, HOLD, HEAT, or COOL button is pressed, SETPOINT and the temperature setting appears for 15 seconds. If desired, start making changes within 15 seconds or the HOME screen will return. The backlight will turn off 15 seconds after the HOME screen reappears.

DAY/TIME - Setting the Day and Time

Press the DAY/TIME button and set the CURRENT hour, minute, and day of week as follows:

1. "AM12" will flash on the screen. Press the UP/DOWN arrows to change the hour. ("AM" or "PM" must correspond to time of day.) Press the DAY/TIME button **OR**, if adjusting for daylight savings time, pressing the ENTER button stores the single change and exits to the HOME screen, bypassing minutes and day of week.
2. Minutes will flash. Use the UP/DOWN arrow button to display the minutes past the hour. Press the DAY/TIME button.
3. Day "MO" (Monday) will flash. Use UP or DOWN arrow buttons to display the current day. Day selections are abbreviated as "MO", "TU", "WE", "TH", "FR", "SA", and "SU". Press the DAY/TIME button.
4. The HOME screen reappears; confirm day and time are correct. This completes day and time setting.

HEAT - Using the Heat Mode

Enabling and Disabling Heat Mode

The thermostat must be in the heat mode to control the heating equipment. Press the HEAT button to enable or disable heat mode. If the thermostat is in cool or off mode, pressing the HEAT button enables the heat mode (indicated by HEAT in the lower right corner - see figure 4).

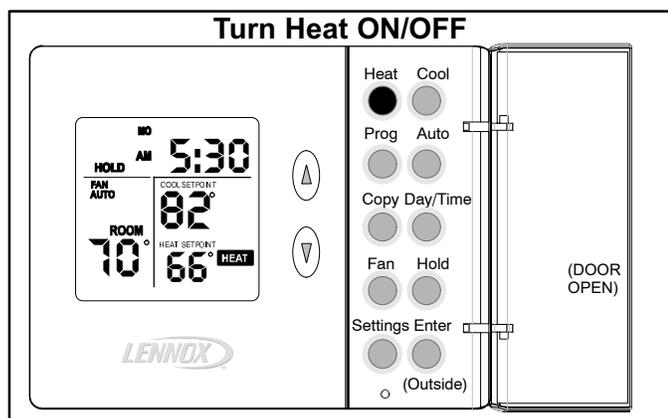


Figure 4

If the thermostat is in heat mode, heat mode is disabled when the HEAT button is pressed. This is indicated by OFF near the right side of the display as shown in figure 5.

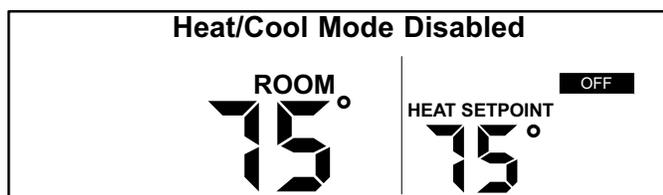


Figure 5

Heating Demand

Set the thermostat to heat mode to control the heating equipment. Then, if the room temperature is lower than the temperature setpoint, as shown in figure 6, the thermostat detects a heating demand and will activate the heating equipment to satisfy the demand.

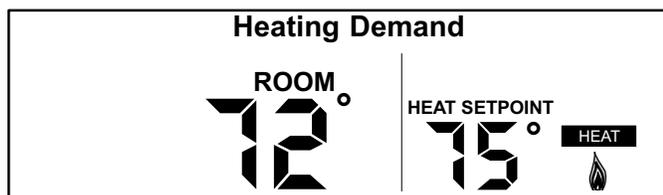


Figure 6

Heating operation is indicated by a flame icon in the lower right corner. When the actual temperature rises above the temperature setpoint, the flame icon will disappear. This indicates that the heating demand has been satisfied and that the heating equipment has been turned off.

NOTE - Heating equipment is activated for at least 3 minutes if no buttons are pressed during the demand interval.

COOL - Using the Cool Mode

Enabling and Disabling Cool Mode

Use the COOL button to enable or disable cool mode as desired. If the thermostat is in heat or off mode, cool mode is enabled when the COOL button is pressed. This is indicated by COOL on the right side of the display (see figure 7).

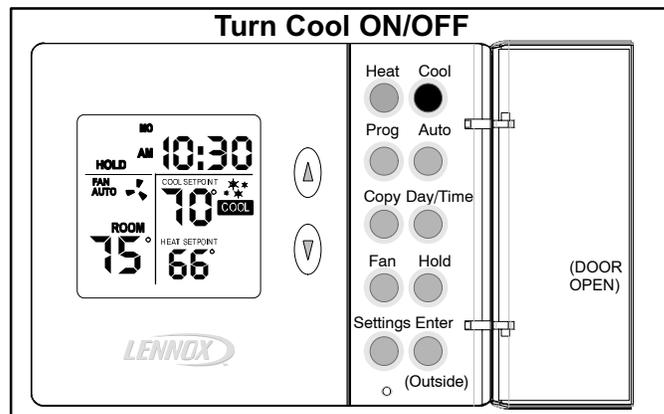


Figure 7

If the thermostat is in cool mode, pressing the COOL button disables cool mode (indicated by OFF, similar to figure 5).

Cooling Demand

Set the thermostat to cool mode to control the cooling equipment. Then, if the room temperature is higher than the temperature setpoint, as shown in figure 7, the thermostat detects a cooling demand and will activate the cooling equipment to satisfy the demand.

Cooling operation is indicated by flashing "snowflake" icons in the display. When the actual temperature drops below the temperature setpoint, the snowflake icons will disappear. This indicates that the cooling demand has been satisfied and that the cooling equipment has been turned off.

NOTE - If no buttons are pressed during a demand for cooling, the equipment must operate for at least 4 minutes. After a demand has been satisfied, cooling equipment operation is locked out for 5 minutes. If another cooling demand occurs during this 5-minute interval, "COOL" and the snowflakes will flash; however, the cooling equipment will not operate until the 5-minute delay has elapsed.

NOTE - The cooling setpoint cannot be lower than the heating setpoint. Also, the difference between the cooling and heating setpoint must be at least 4 degrees.

AUTO - Using the Autochangeover Mode

When in either heat mode or cool mode, autochangeover can be enabled or disabled by pressing the AUTO button. If enabled, AUTO appears at the lower right corner of the display. The thermostat will then automatically change over from heating to cooling and vice versa, to keep the room temperature in between the heating and cooling setpoints. Autochangeover can be used in either of the thermostat hold modes, or when the thermostat program is running. These modes are described later.

HOLD - Using Temperature Hold Modes

When HOLD is displayed at the HOME screen, the thermostat is in a temperature hold condition. This means that the temperature program data is ignored and the thermostat functions much like a non-programmable thermostat.

Adjusting Temperature Setpoint in Hold Mode

The temperature setpoint represents the desired temperature of the space around the thermostat. The default heat setpoint in hold mode is 70°F; the default cool setpoint in hold mode is 78°F.

To adjust the setpoint, press the UP or DOWN (▲▼) arrow buttons (see figure 8); the existing setpoint is displayed to the right of the actual room temperature. Each button press adjusts the setpoint up or down by 1 degree.

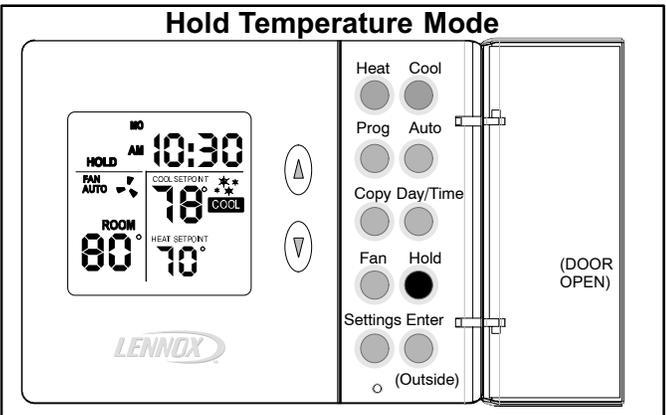


Figure 8

After the desired setpoint is reached, the HOME screen will reappear after about 15 seconds.

Permanent Hold Mode

At any time the program is running, from the HOME screen, set a permanent hold (program override) by pressing the HOLD button (see figure 8). The thermostat now functions much like a non-programmable thermostat. Use the Up/Down arrow buttons to adjust the hold setpoint. To return to the program, press HOLD again.

Temporary (2-Hour) Hold

At any time the program is running, from the HOME screen, set a temporary 2-hour hold by pressing the Up/Down arrow buttons until the desired setpoint is displayed; "HOLD" flashes (see figure 9). This overrides the program for 2 hours from the last button press, then returns to the program.

While in Temporary Hold, press HOLD once to switch to Permanent Hold (HOLD displays solid; PROG not displayed); press HOLD again to return to the program (PROG displays; HOLD not displayed).

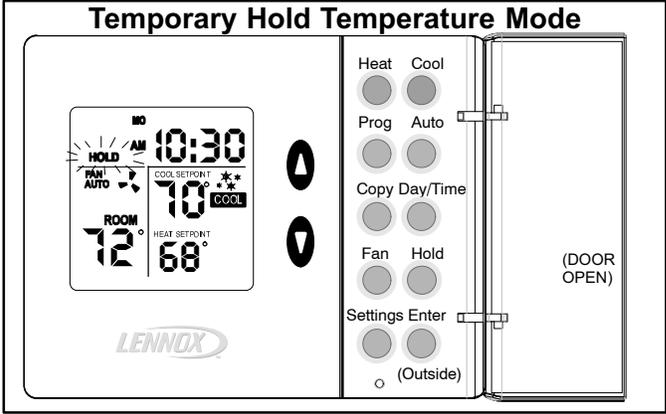


Figure 9

PROG - Thermostat Programming

The 51M38 thermostat can be programmed to perform a set of both heating and cooling events for each day of the week. Each day can be programmed for 4 unique events per day, and each day can be different from any other day.

To Set Program Events and Temperatures

Figure 10 gives an example of how up to 7 different programs can be set. Programs A and C reflect the desired warmth while the home IS occupied (72°); B allows less heating while the home is NOT occupied; D reflects a cool sleeping temperature.

NOTE - The example in figure 10 shows heat setpoints; a similar program may be set for cool setpoints.

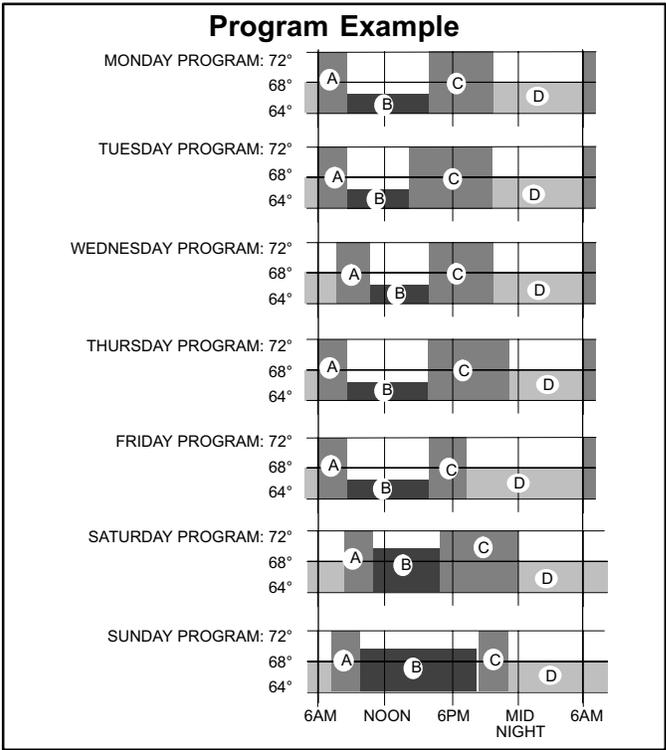


Figure 10

NOTE - Pressing the ENTER button during the following programming steps, saves and exits to the HOME screen. To program events and temperatures, perform the following steps.

1. Press and release the PROG button. "MO" (Monday), "AM 6:00", period "A", "COOL SETPOINT 78", and "HEAT SETPOINT 70" are displayed. "AM 6" flashes.
2. Use the Up/Down arrow buttons to select the desired hour; press the PROG button when the desired hour is reached; use the Up/Down arrow buttons again to select desired minute. The selected hour/minute is when the program will start. Press the PROG button.
3. Use the Up/Down arrow buttons to select the desired heat setpoint; press the PROG button.
4. Use the Up/Down arrow buttons to select the desired cool setpoint; press the PROG button.
5. Repeat steps 1 - 4 for Monday, periods B, C, and D.
6. **COPY A PROGRAM** - If the program entered for Monday is satisfactory for other days of the week, do the following to repeat the same program for other days:
 - A Press the PROG button, then press the COPY button. The display clears the screen except for "Copy from MO" with "MO" flashing. Press the COPY button again to copy Monday's program.
 - B The display changes to "Copy to MO". Use the arrow buttons to scroll to the desired day where you want the same program as Monday. Press the COPY button.
 - C Repeat steps A and B for as many days as you want the same program.

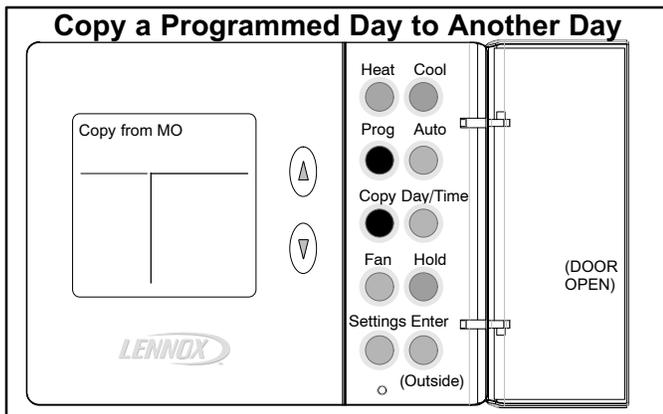


Figure 11

7. Repeat steps 1 - 5 to program different times and temperatures for days not yet programmed.

FAN - Controlling the Fan Operation

Use the FAN button to select either continuous fan mode or auto fan mode.

To change from continuous to auto fan mode (or vice versa), press the FAN button. Note whether a fan icon in the FAN box is present (indicating that the fan is running) or not (fan not running).

If continuous fan mode is enabled (ON displayed in FAN box - see figure 12), the fan will run continuously regardless of whether the heating or cooling equipment is running.

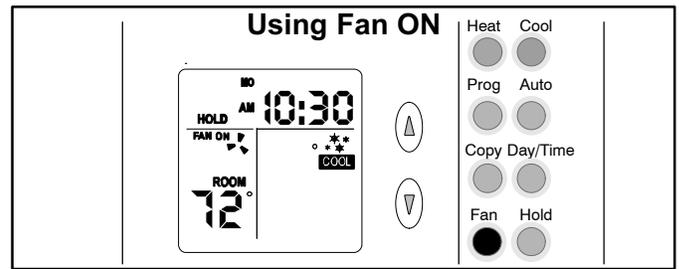


Figure 12

If auto fan mode is selected (AUTO displayed in FAN box - see figure 13), the fan will only run when the heating or cooling equipment is running.

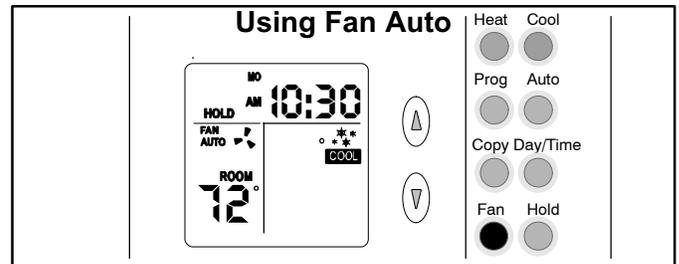


Figure 13

Displaying Outside Temperature

Pressing the ENTER (Outside) button at the HOME screen displays the outside temperature (see figure 14) for several seconds, then returns to room temperature.

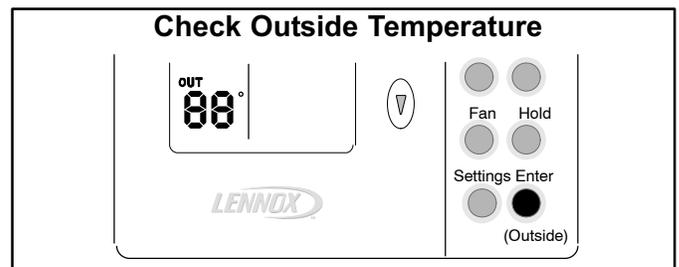


Figure 14

SETTINGS - Filter/Maintenance Reminders

The 51M38 thermostat is designed to remind you when the filter needs changing or when routine maintenance is required, as (and if) defined, by you. These optional reminders are not enabled until you activate them. To do so, press the SETTINGS button once or twice for the desired reminder as shown in figure 15 and as described in table 1.

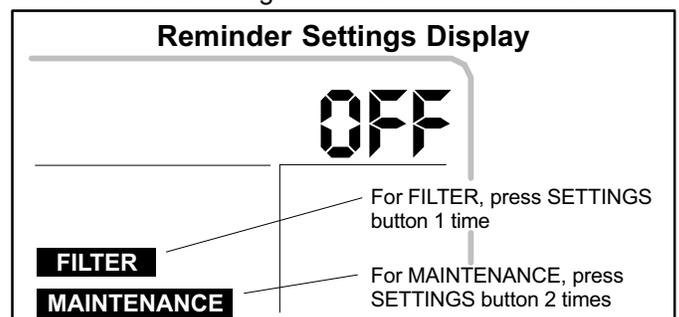


Figure 15

The default setting for the reminders is OFF (disabled). Press Up/Down arrow buttons to select the desired reminder intervals.

Table 1

Filter and Maintenance Reminders		
Buttons to Use	Reminder	Available Settings and How to Use
SETTINGS (1st press) then Arrows to scroll selections	FILTER	Total fan run time expressed in months (Off, 1, 3, 6, 12); for example, if fan runs 12 hours a day, 1 month reminder displays in 2 calendar months.
SETTINGS (2nd press) then Arrows to scroll selections	MAINTENANCE	Elapsed chronological time in months (Off, 6, 12). Use this, for example, to remind yourself when to perform routine checks or when to call a technician for periodic preventive maintenance.
Enter		Stores settings.

NOTE - The HOME screen will reappear about 15 seconds after the final arrow button press. OR, press the ENTER button at any time to store any changes and exit to the HOME screen.

After either programmed interval has elapsed, the reminder will be displayed as shown in figure 16.

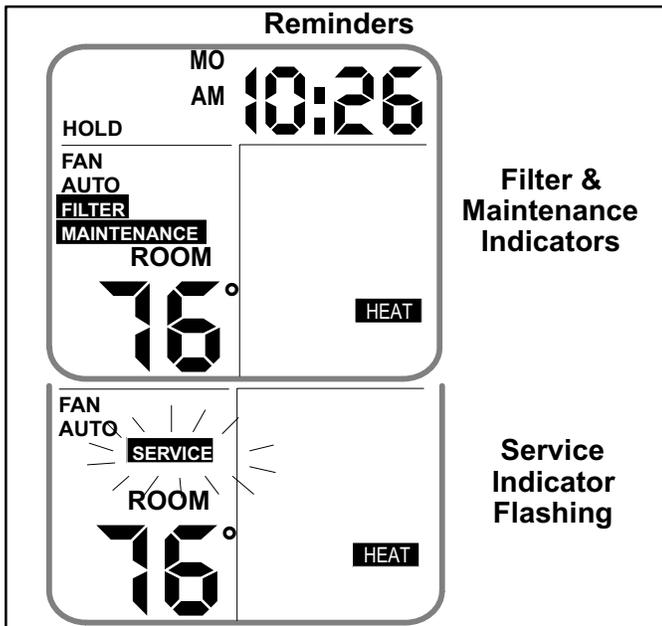


Figure 16

After the filter has been changed or maintenance performed, reset the reminder by pressing the SETTINGS button for 4 seconds at the corresponding reminder settings screen. The screen will blink for a few moments to indicate that the timer has been reset.

Service Indicator

When abnormal equipment operation is detected, the SERVICE indicator will flash on the screen (see figure 16). This indicates that the equipment requires service from a qualified service technician.

Thermostat RESET

Under some abnormal conditions, it may be necessary to “reset” the thermostat to its default condition. Such a RESET would delete all programming and settings and therefore should only be used on rare occasions when the thermostat fails to function as designed and/or as programmed. Such an instance can occur as a result of a power surge or similar electrical disturbance (e.g. after an electrical storm or power outage). The RESET button can be used to recover from this situation.

CAUTION

When the RESET button is pressed, ALL settings revert back to the defaults, including the default program (see tables 2 and 3).

The RESET button is an unlabeled, recessed button located behind the door on the right-hand side of the thermostat, below the SETTINGS button (see figure 3). Use a paper clip or small pencil to press the RESET button; ALL thermostat settings will be reset to the defaults listed in the Default Thermostat Settings section.

Removing/Installing Thermostat

The thermostat hinges on tabs on the top of the subbase; no tool is needed to remove the thermostat from the subbase. Pivot the bottom of the thermostat outward (releasing the snaps), then lift up to remove.

To replace it, first position the top tilted toward the wall bracket and align it until you feel the tabs and slots engage; then, while the top is in place, pivot the bottom toward the wall until the thermostat snaps into place.

Default Thermostat Settings

Default thermostat settings are in table 2 and the default program is shown in table 3.

Table 2

Default Thermostat Settings	
Mode	Heat (Perm. Hold)
Heat Setpoint (Perm Hold)	70°F (or 21°C)
Cool Setpoint (Perm Hold)	78°F (or 26°C)
Fan	Auto
Filter Reminder	OFF
Maintenance Reminder	OFF
Equipment Protection Timers	Reset Back to Zero
Autochangeover	OFF

Table 3

Default Program Settings (Time & Temp.)			
Programs	Time	Temp. - Heat	Temp. Cool
All days - A	6:00am	70°F / 21°C	78°F / 26°C
All days - B	8:00am	62°F / 17°C	85°F / 29°C
All days - C	6:00pm	70°F / 21°C	78°F / 26°C
All days - D	10:00pm	62°F / 17°C	82°F / 28°C

Thermostat Output Table

Table 4 depicts the 51M38 thermostat output states for various input conditions.

Table 4

Thermostat Outputs			
Condition	W1	Y1	G
Gas Heat, Auto Fan			
Heat Demand	X		
Cool Demand		X	X
No Demand			
Gas Heat, Continuous Fan			
Heat Demand	X		X
Cool Demand		X	X
No Demand			X
Electric Heat, Auto Fan			
Heat Demand	X		X
Cool Demand		X	X
No Demand			
Electric Heat, Continuous Fan			
Heat Demand	X		X
Cool Demand		X	X
No Demand			X

NOTE - X = output is activated with 24VAC.

Technical Specifications

Thermostat Type

Electronic programmable thermostat for 1-Stage Heat/1-Stage Cool, gas or electric heat, non-heat pump, non-power robbing applications.

Power Supply Range

18VAC - 30VAC (24VAC nominal), 60Hz

CAUTION

24VAC is present on the terminals of the thermostat bracket. If removing the thermostat from the wall, use caution and avoid touching any of the connector terminals on the wall bracket.

Also, when working with the thermostat dip switches, use a non-conductive tool and take caution to avoid making any contact with the circuit board, its imprinted circuitry and its connector prongs.

Temperature Display

Display Scale: Fahrenheit or Celsius user selectable (via DIP switch; see figure 17)

Display range: 35°F (2°C) to 99°F (37°C)

Display resolution: 1°F (1°C)

Display Accuracy: +/-1°F

If the Fahrenheit/Celsius display must be changed, use a plastic, non-conductive tool to push the dip switch to the right position (see figure 17).

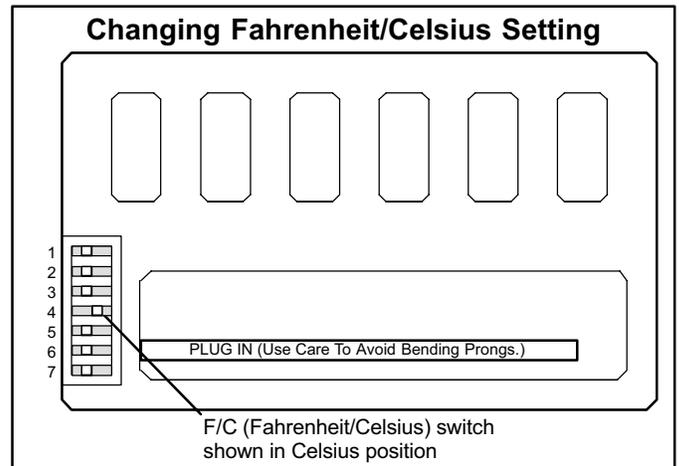


Figure 17

Indoor Temperature Measurement Range

Measurement Scale: Fahrenheit

Measurement Range: 35°F to 99°F

Measurement Resolution: 0.5°F

Measurement Accuracy: +/-1°F

Field Offset: via DIP switches to +/-3°F

Sampling Method: temperature measurements sampled every 15 seconds. Displayed temperature is the average of the last four measurements.

Outdoor Temperature Measurement Range

Measurement Scale: Fahrenheit

Measurement Range: -22°F to 122°F

Measurement Resolution: 1°F

Measurement Accuracy: +/-2°F

Temperature Setpoint Range

Setting range: 50°F (10°C) to 90°F (32°C)

Setting resolution: 1°F (1°C)

Smart Setback Recovery (via DIP switch #6)

Smart Setback Recovery (SSR) affects the way the thermostat responds to program events. If SSR is disabled, the thermostat will react to a program event at the time the event occurs. However, if SSR is enabled, the thermostat will react to a program event before the event occurs such that the desired temperature is reached at the time of the event, not after.

Autochangeover Deadband Selection (via DIP switch #7)

Autochangeover deadband can be set to 4 or 6 degrees. When autochangeover is enabled (via the AUTO button), the thermostat will automatically change over from heating to cooling and vice versa, to keep the room temperature in between the heating and cooling setpoints. The deadband is the minimum difference between the heating and cooling setpoints.

Fan Control

AUTO or ON modes, gas or electric heat compatible via DIP switches (also see Thermostat Output section).

I/O Relays

All thermostat relays are latching type to minimize power consumption.

Table 5

51M38 Terminal Designations	
Terminal	Description
R	24VAC
Y1	First stage cooling
W1	First stage heating
G	Fan control
L	Service Indicator
C	24VAC common
T	Outdoor temperature sensor connection 1
T	Outdoor temperature sensor connection 2

Equipment Protection Timers

Minimum Compressor OFF time: 5 minutes

Minimum Compressor ON time: 4 minutes

Minimum Furnace ON time: 3 minutes

Minimum furnace cycle time (elapsed time between any furnace activation and the next furnace activation): 6 minutes.

Minimum elapsed time between any compressor activation and the next compressor activation: 6 minutes.

NOTE - All protection timers (except the compressor OFF timer) can be over-ridden if a heating or cooling demand is initiated or terminated using the UP, DOWN, HEAT, or COOL buttons.

Equipment Protection Override

Both the minimum compressor OFF timer and the minimum equipment cycle timer can be over-ridden by pressing and holding either the HEAT or COOL button down for 4 seconds.

Over-Temperature Protection

Thermal-mechanical switch opens W1 at 93°F+/-6°F.

Filter Reminder

Settings of Off, 1, 3, 6 or 12 (months of fan run time) are available. When programmed time has elapsed, a FILTER indicator is displayed.

Maintenance Reminder

Settings of Off, 6 or 12 (months of chronological time) are available. When programmed time has elapsed, a MAINTENANCE indicator is displayed.

Service Reminder

The SERVICE indicator is displayed only under the following conditions:

- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the R terminal;
- OR
- if the thermostat Y1 terminal has been activated with 24VAC for at least 5 minutes, AND the L terminal is shorted to the C terminal.

Power Loss/Recovery

Thermostat memory is retained for a minimum of 24 hours during a power loss (includes retention of clock setting, program information, HOLD status, programmed temperature setpoint, heat/cool and fan mode settings, filter reminder status, maintenance reminder status, and equipment protection timers). After 24 hours of power loss, programmed settings will be lost and replaced with default settings.

IMPORTANT

Power must be applied for at least six consecutive hours prior to a power loss in order for memory to be retained for the specified time.

LCD Backlight

Activated for 30 seconds when any button is pressed.

NOTE - During an electrical storm or similar disturbance, the backlight may activate for a few seconds. This is normal and will no longer occur after the electrical disturbance has passed.

Thermostat Operating Conditions

35°F to 105°F, 5% to 90% RH

Thermostat Storage Conditions

-40°F to 185°F, 5% to 95% RH