

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.

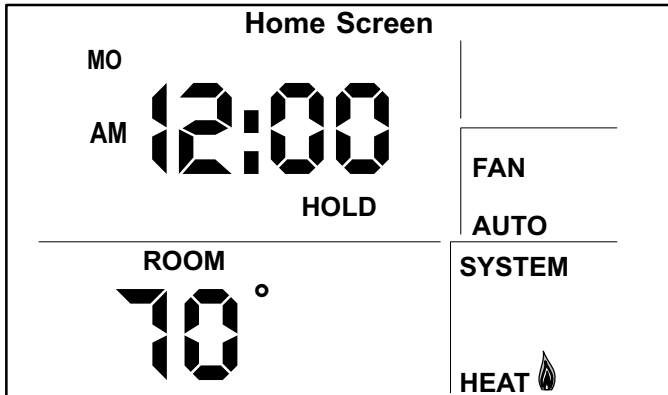


Figure 2

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.

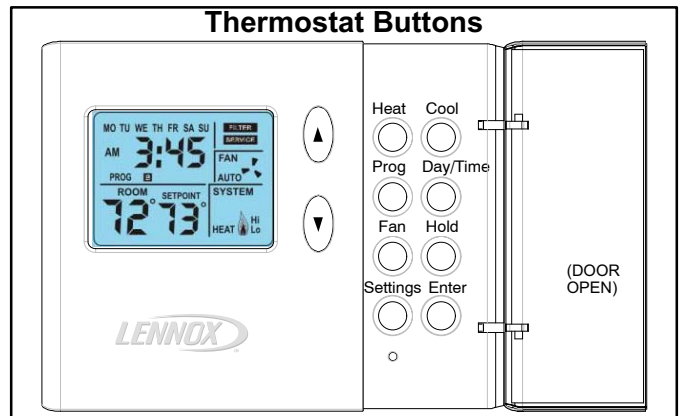


Figure 3

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.

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).

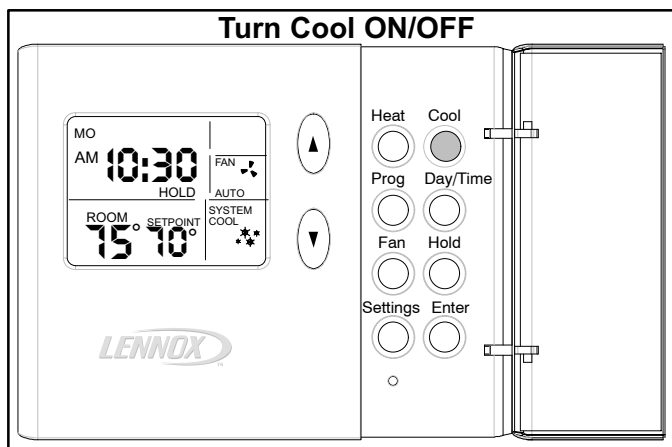


Figure 9

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

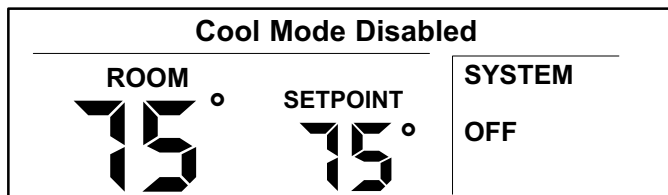


Figure 10

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.

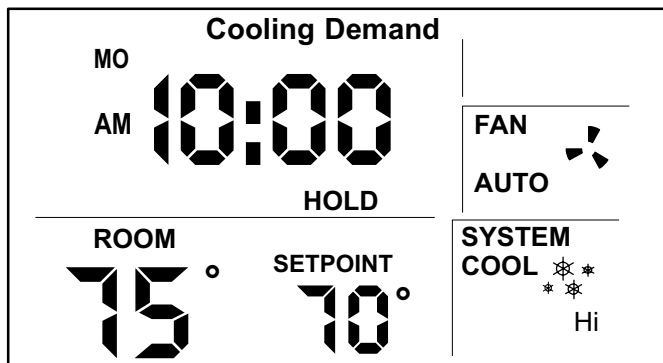


Figure 11

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.

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).

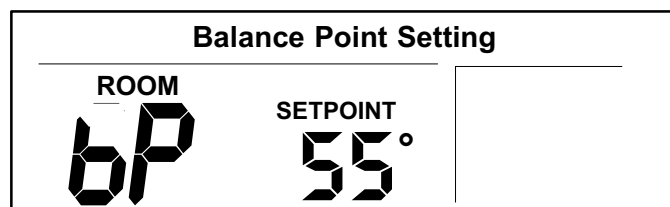


Figure 20

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.

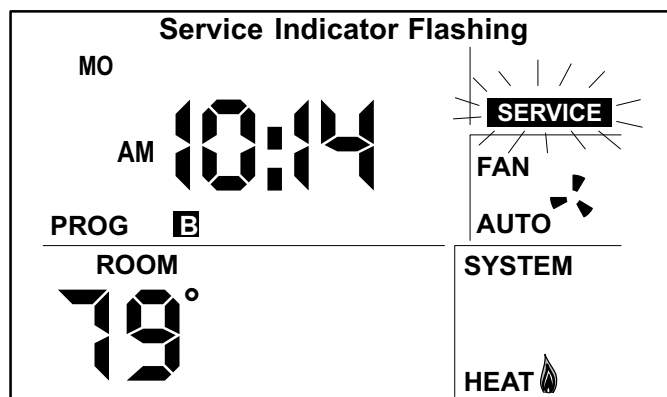


Figure 21

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).

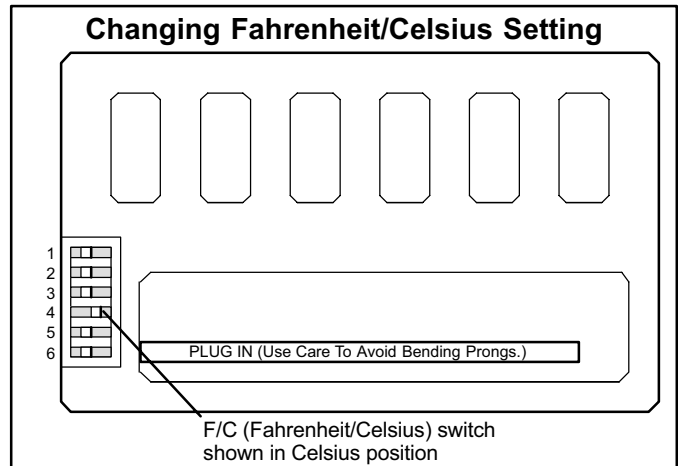


Figure 22

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)



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

Technical Publications
Litho U.S.A.

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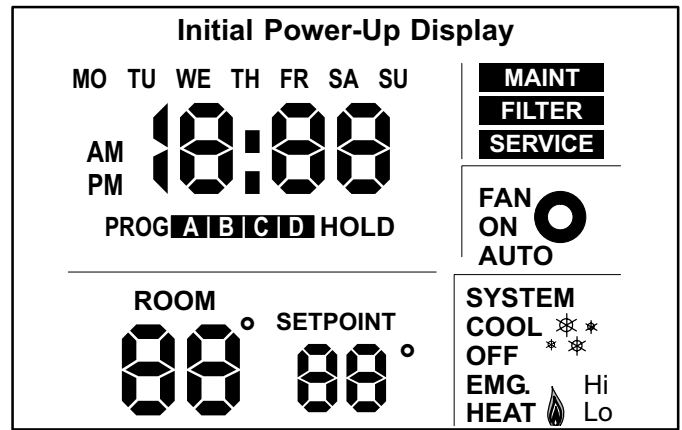


Figure 1

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.

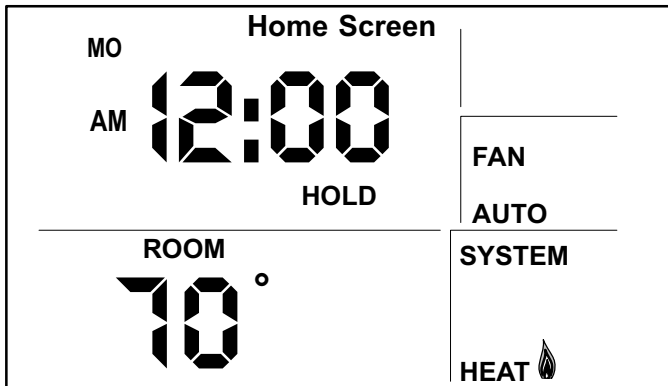


Figure 2

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.

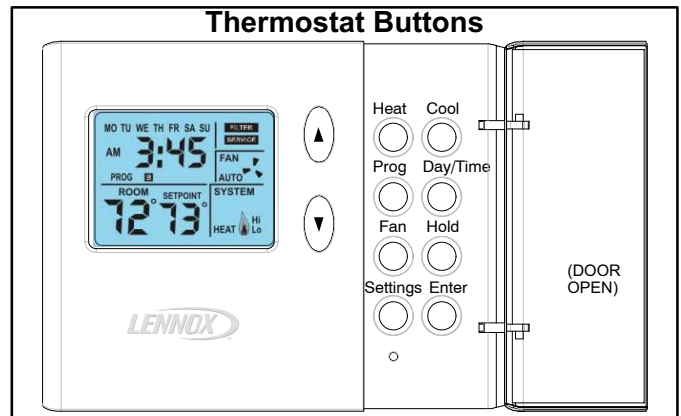


Figure 3

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).

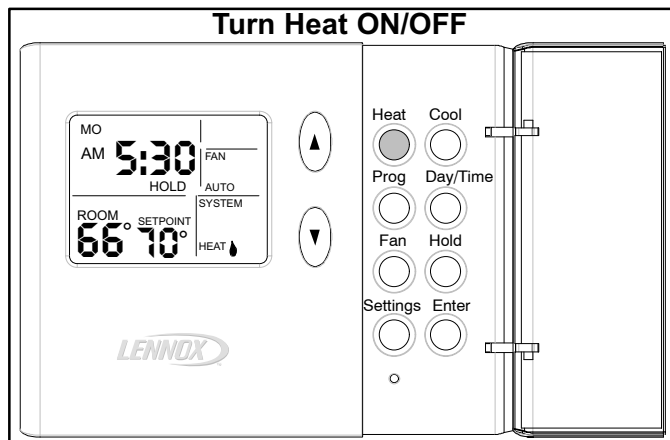


Figure 4

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

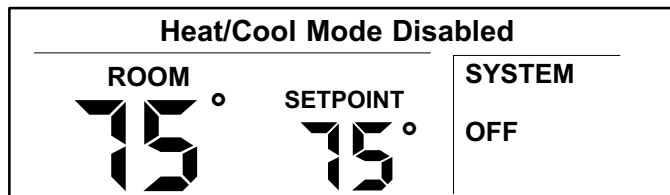


Figure 5

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.

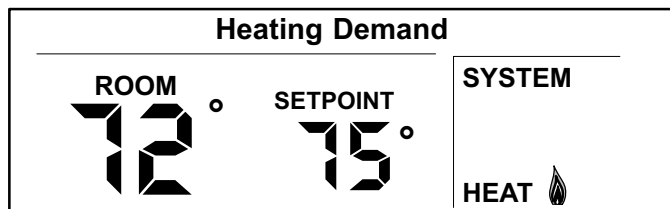


Figure 6

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).

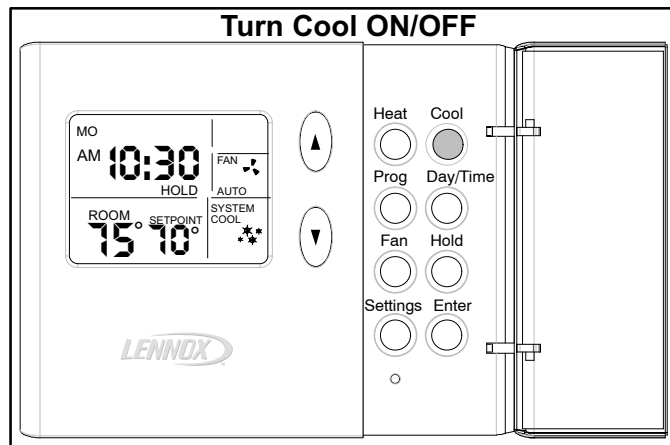


Figure 7

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.

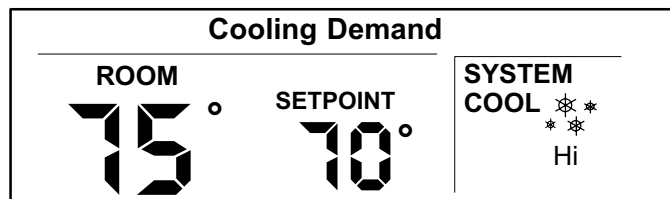


Figure 8

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.

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.

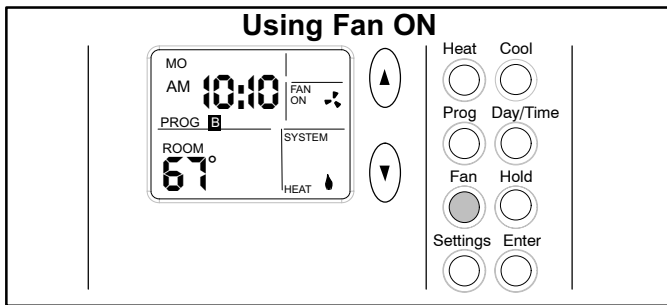


Figure 13

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.

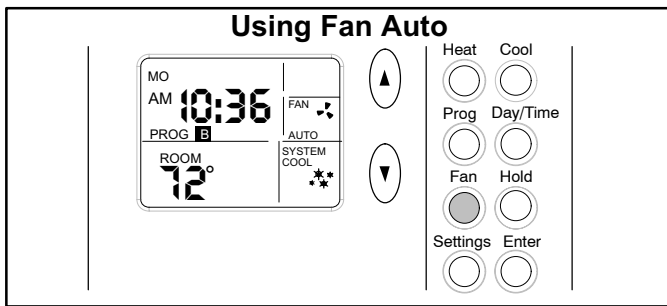


Figure 14

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.

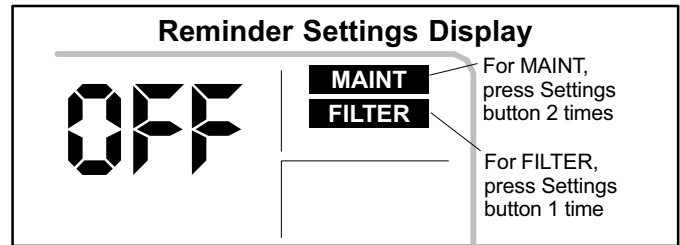


Figure 15

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.

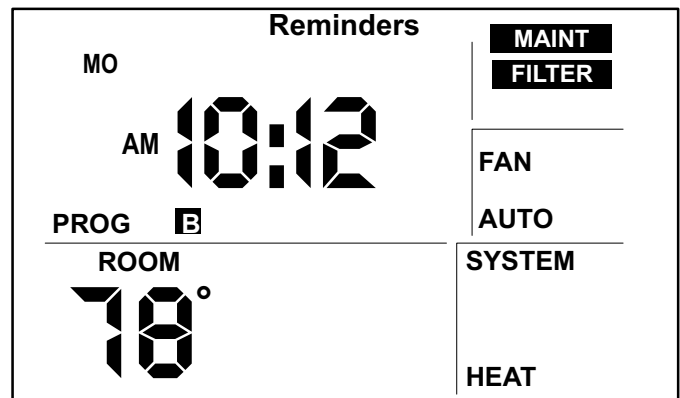


Figure 16

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.

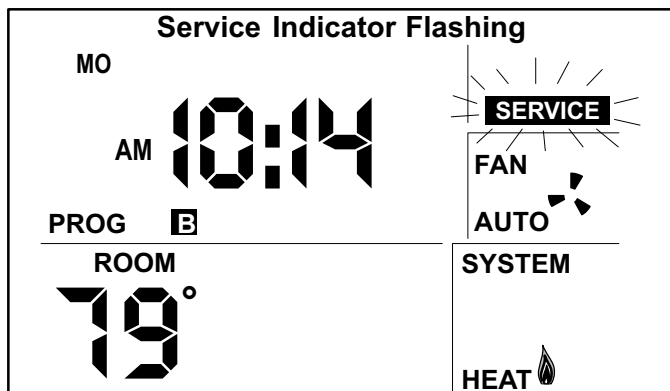


Figure 17

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		



RETAIN THESE INSTRUCTIONS
FOR FUTURE REFERENCE

51M34 Merit® Series Thermostat

The Lennox Merit® Series 5/2 day programmable electronic thermostat 51M34 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 51M34 is suitable for non-heat pump, single-stage heat/single-stage cool applications with either 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 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
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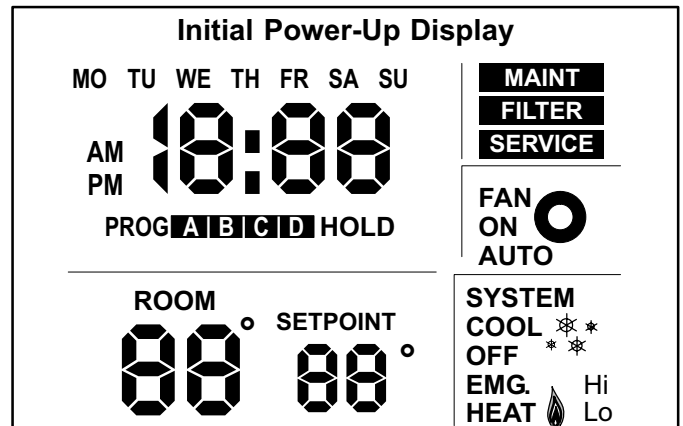


Figure 1

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.

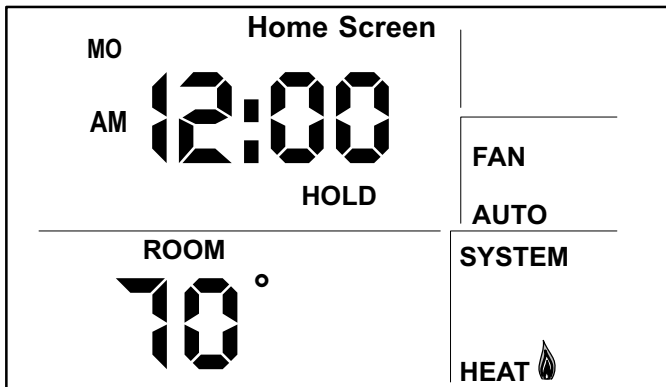


Figure 2

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.

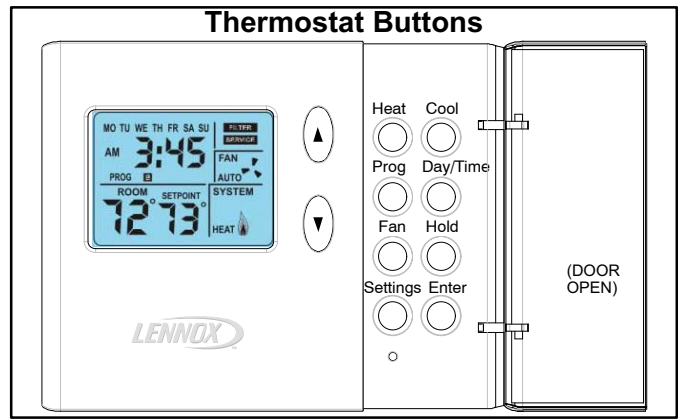


Figure 3

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).

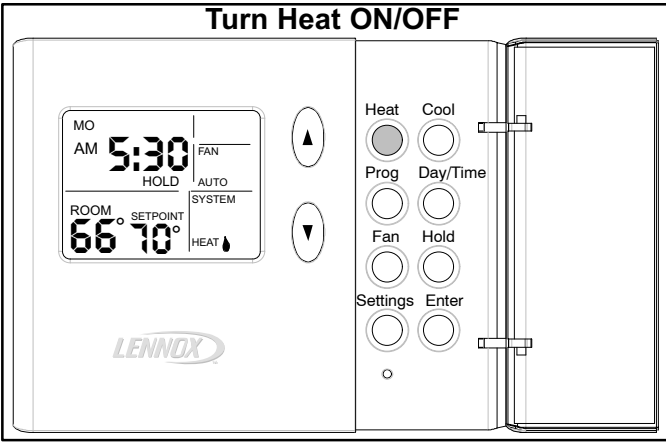


Figure 4

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.

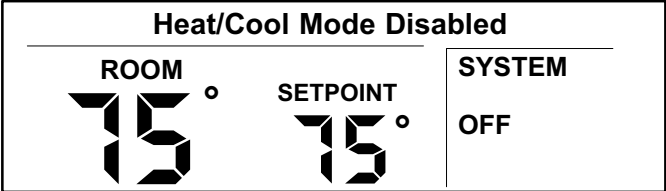


Figure 5

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.

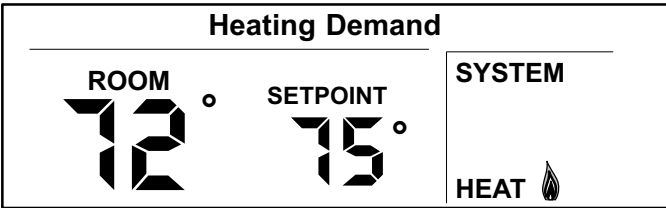


Figure 6

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).

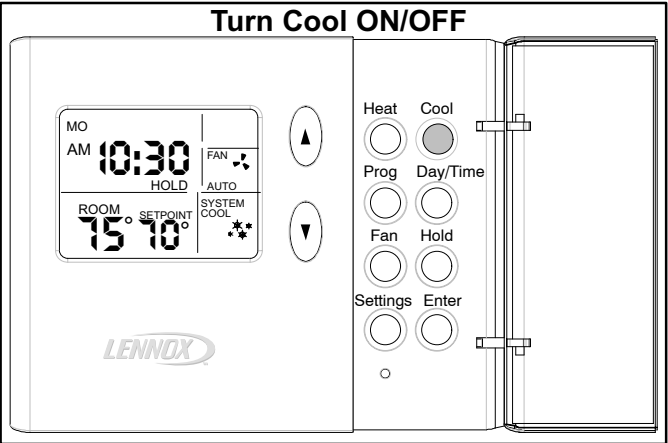


Figure 7

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.

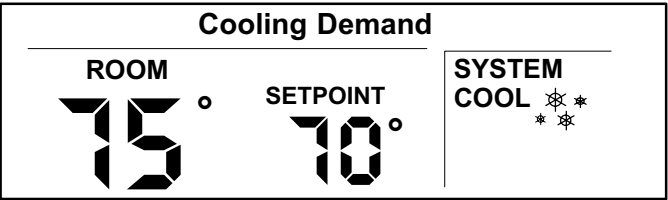


Figure 8

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.

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.

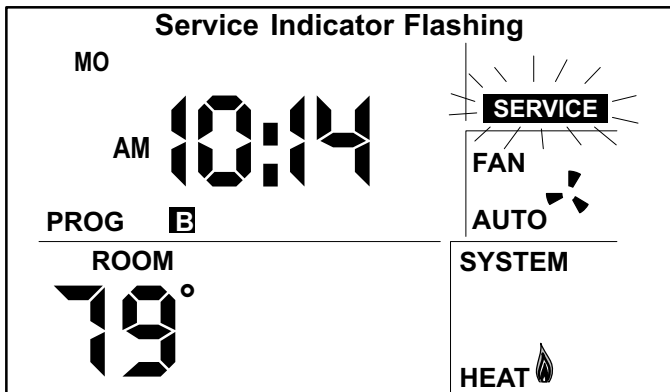


Figure 17

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).

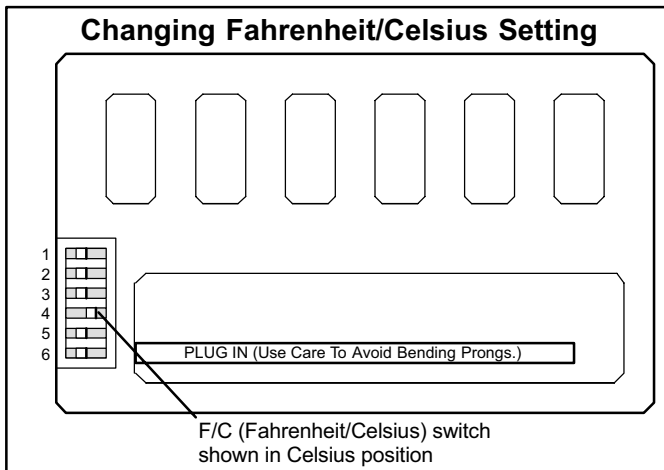


Figure 18

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

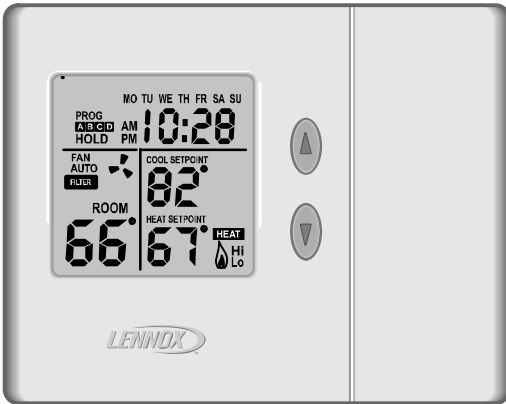
Thermostat Output Table

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

NOTE - X = output is activated with 24VAC.



**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.

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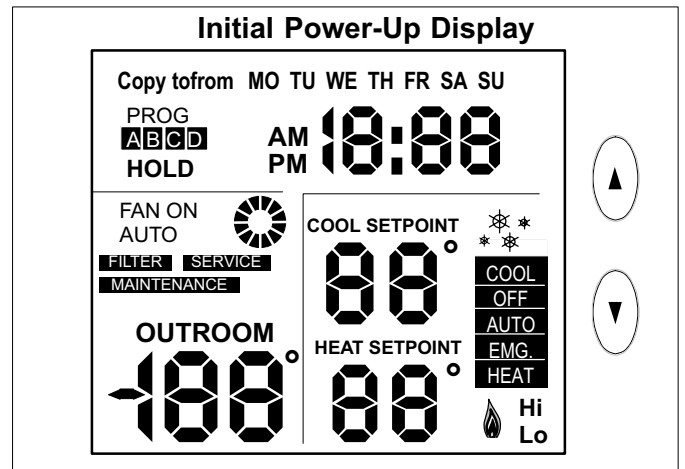


Figure 1

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.

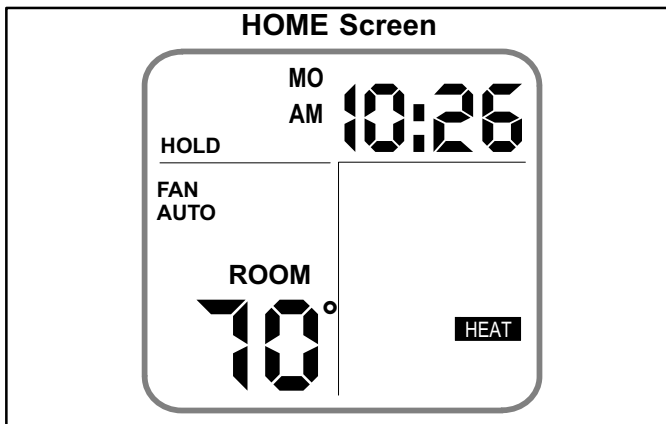


Figure 2

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.

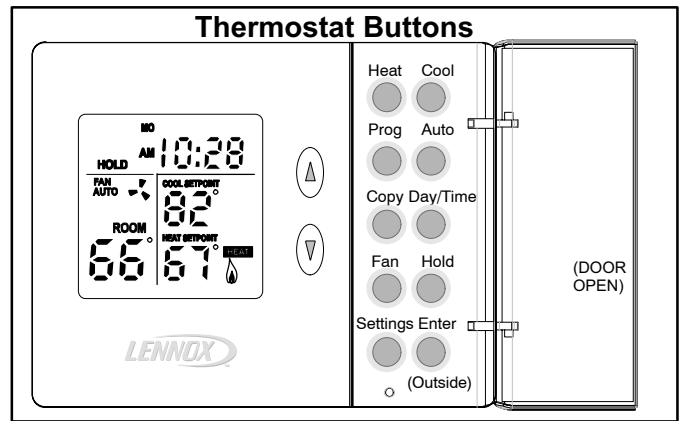


Figure 3

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).

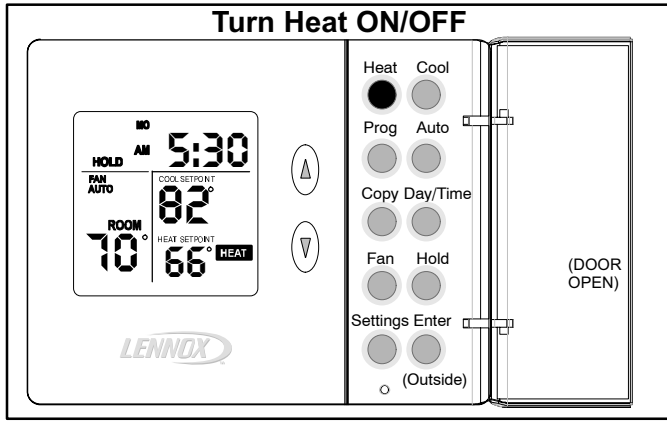


Figure 4

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.

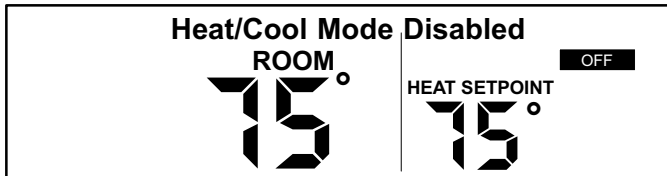


Figure 5

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.

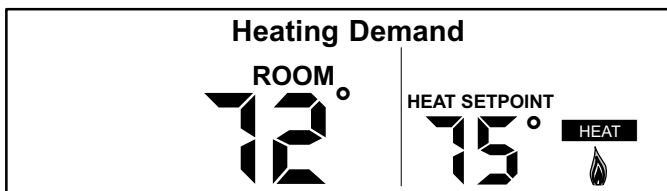


Figure 6

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).

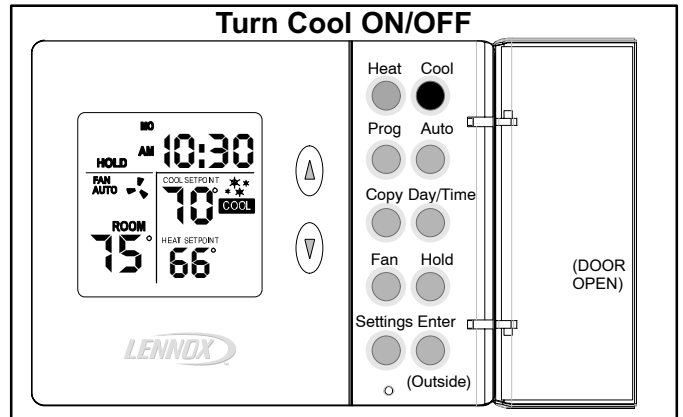


Figure 7

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).

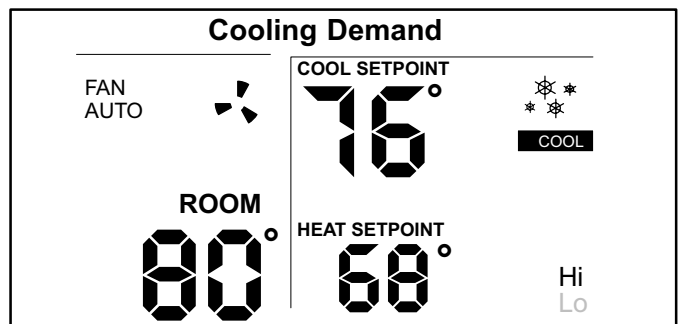


Figure 8

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.

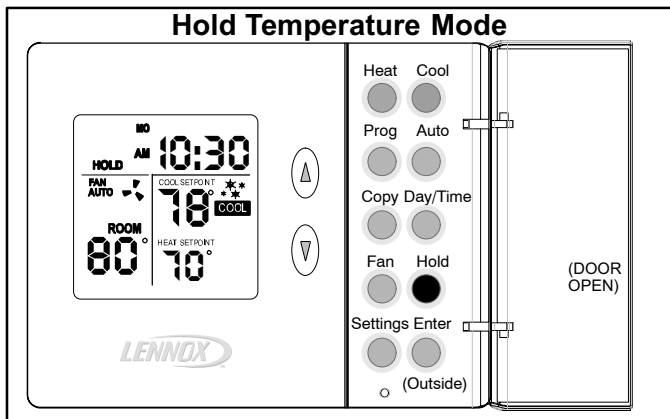


Figure 9

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).

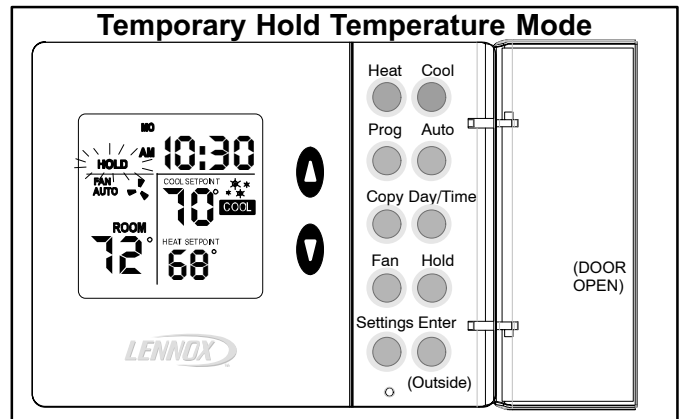


Figure 10

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.

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.

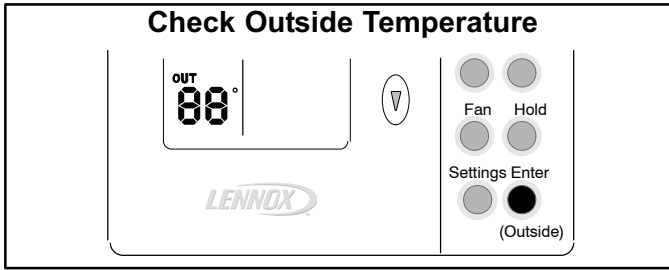


Figure 15

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.

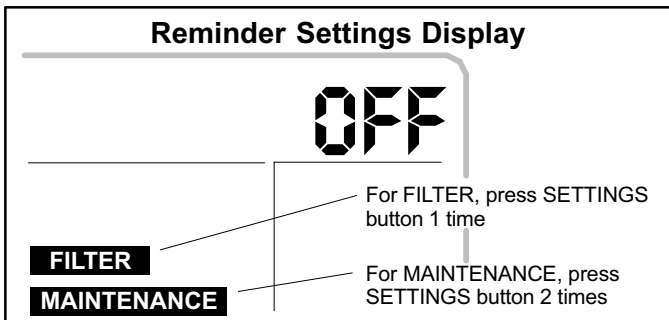


Figure 16

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.

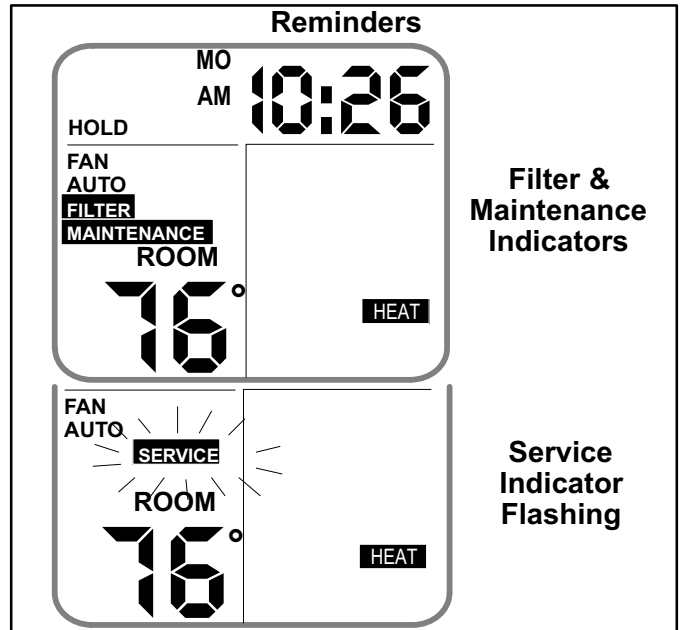


Figure 17

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.

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

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.

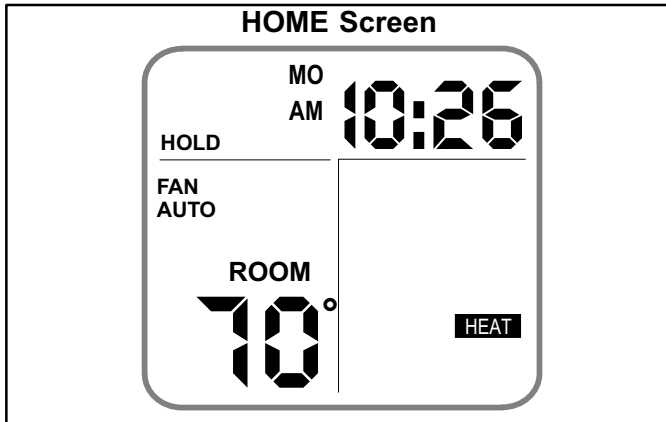


Figure 2

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.

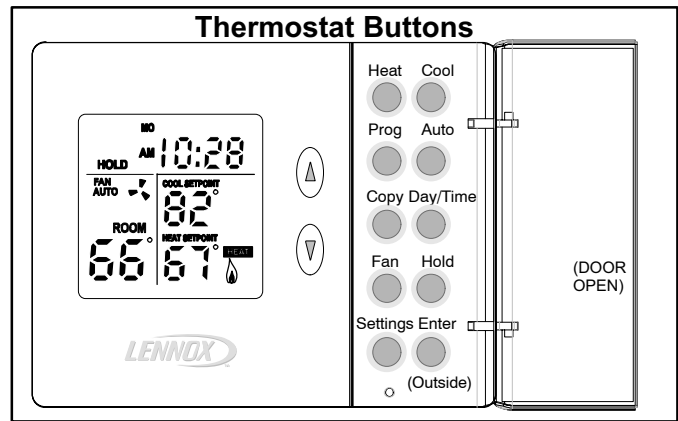


Figure 3

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.

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.

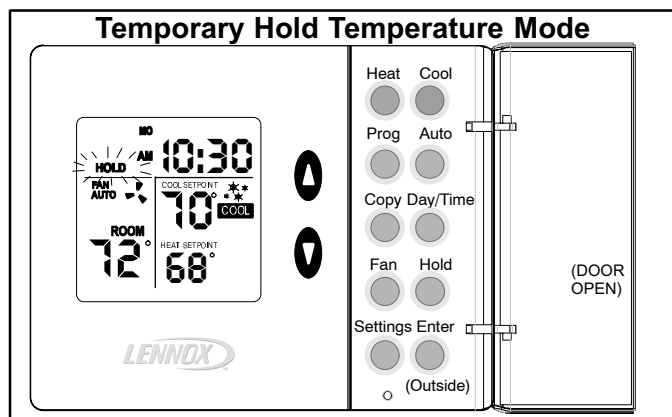


Figure 12

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.

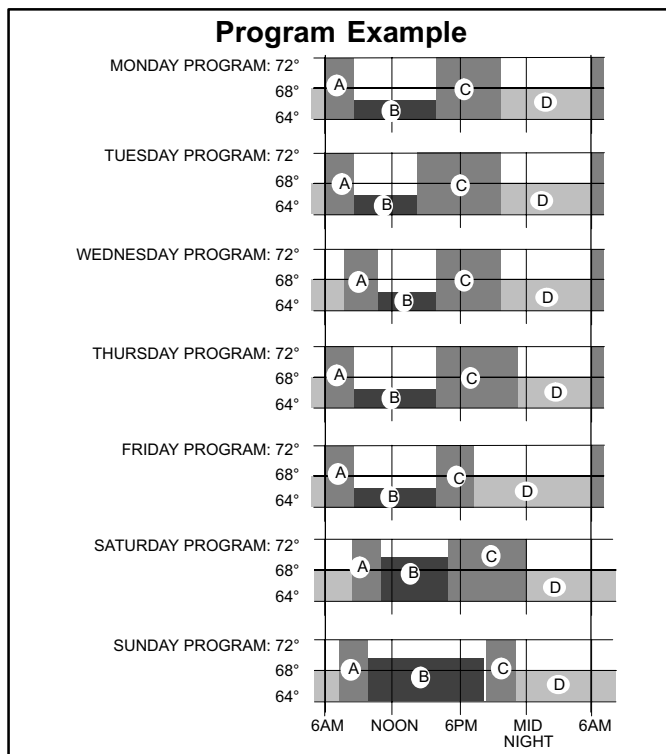


Figure 13

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.

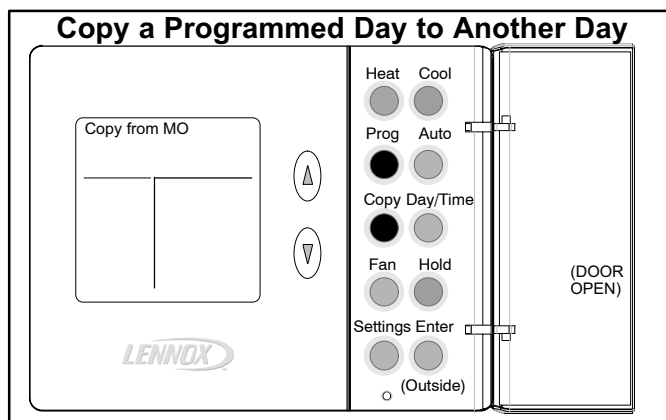


Figure 14

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.

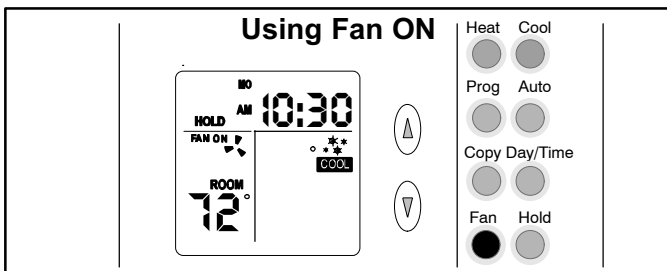


Figure 15

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.

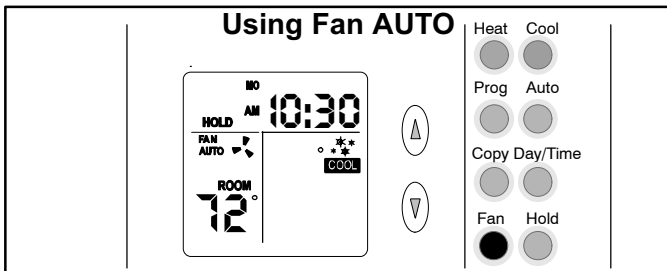


Figure 16

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.

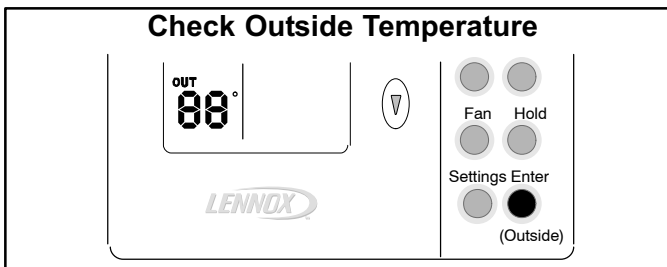


Figure 17

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.

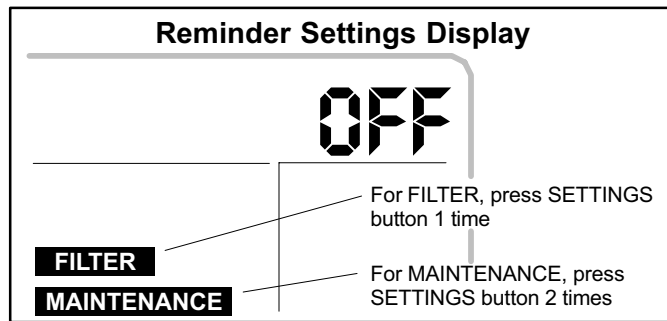


Figure 18

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.

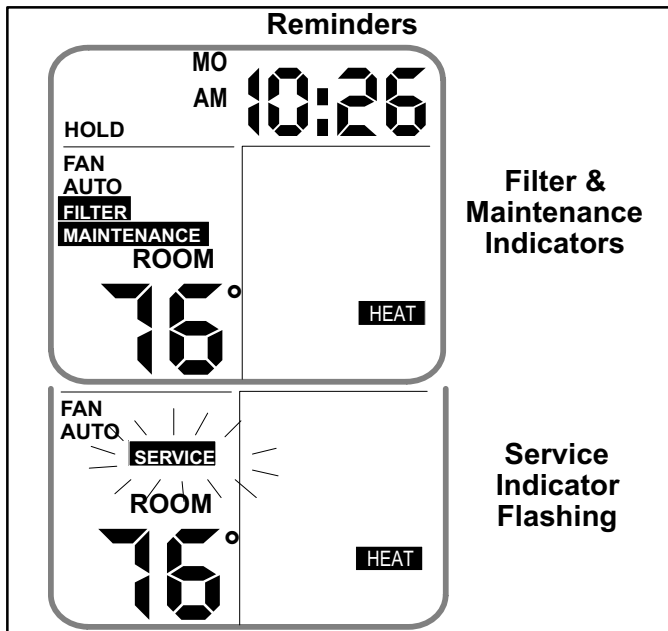


Figure 19

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).

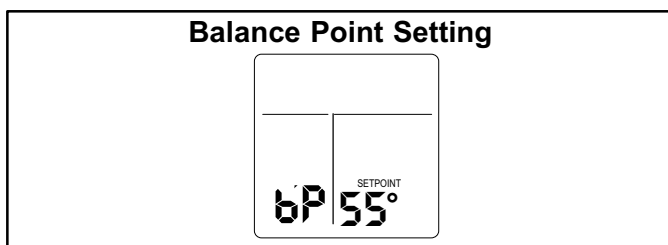


Figure 20

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.

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).

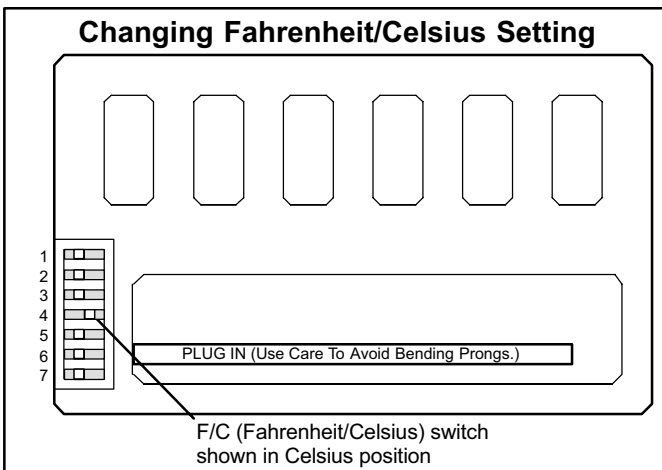


Figure 21

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.

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.

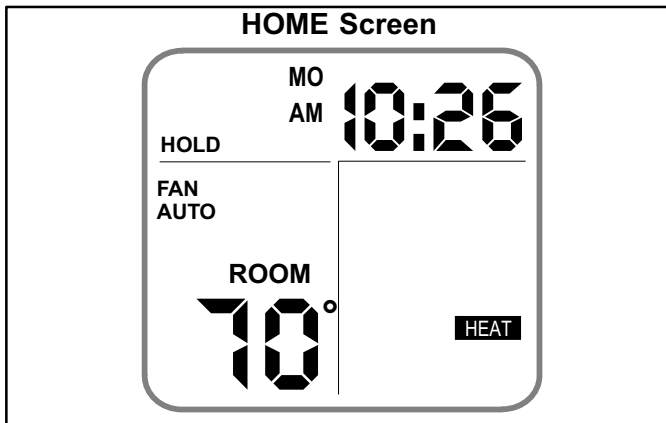


Figure 2

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.

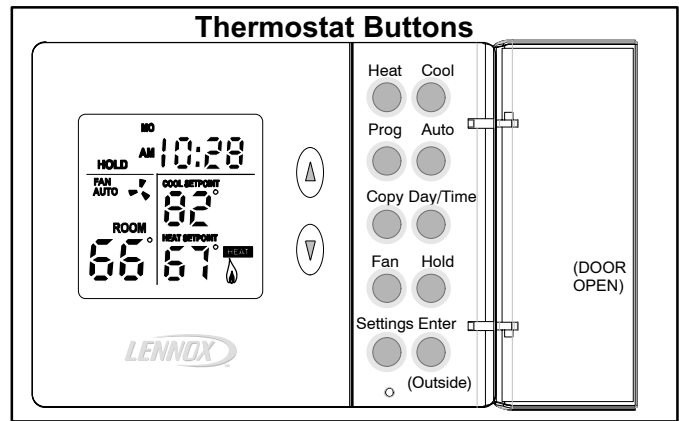


Figure 3

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.

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 (\blacktriangle / \blacktriangledown) 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.

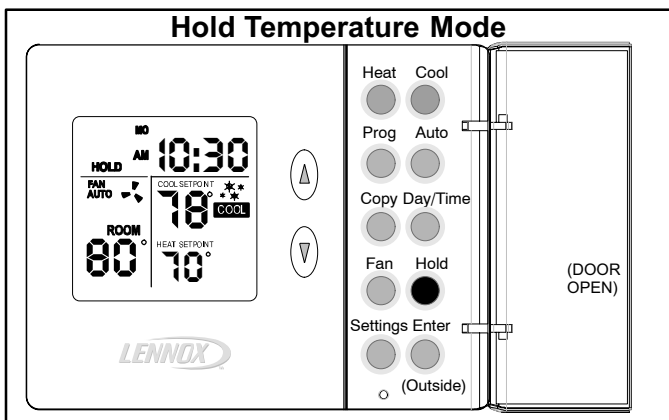


Figure 8

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).

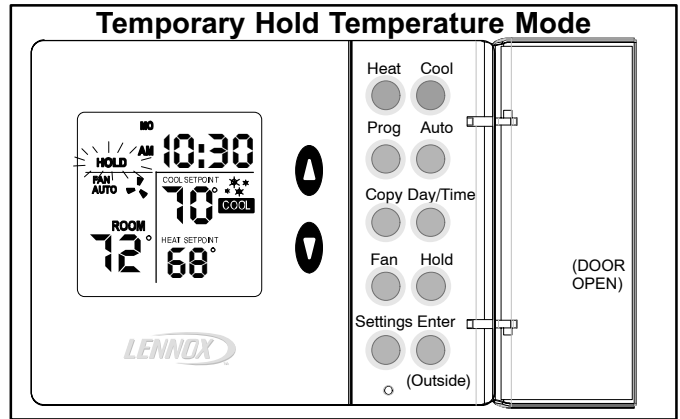


Figure 9

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.

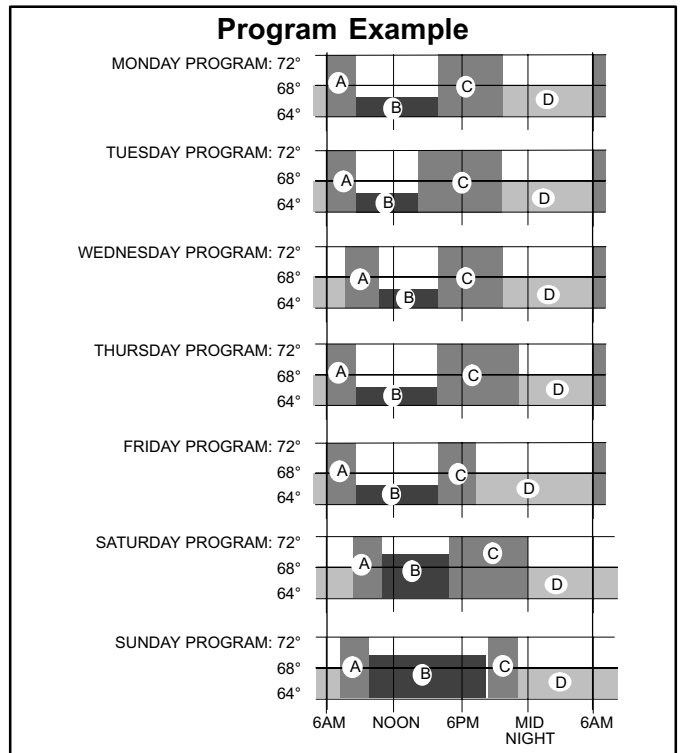


Figure 10

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.

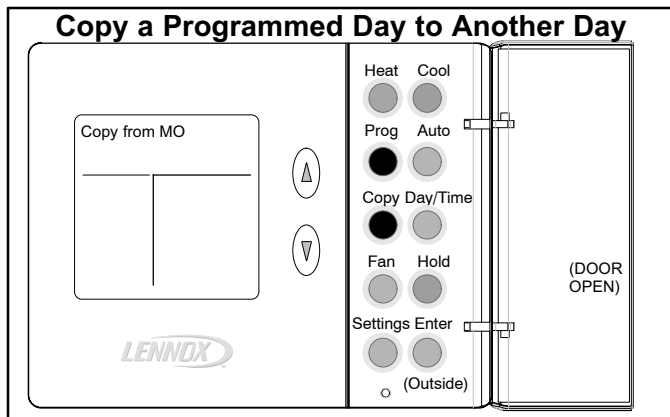


Figure 11

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.

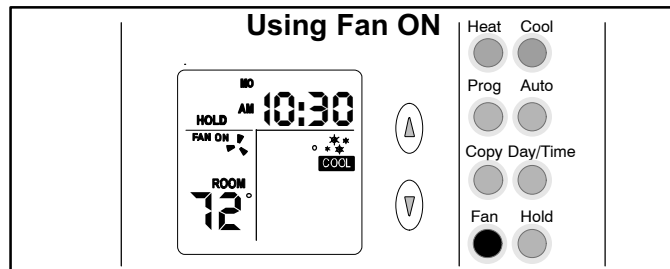


Figure 12

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.

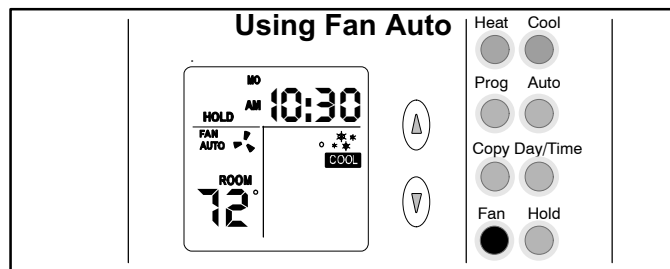


Figure 13

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.

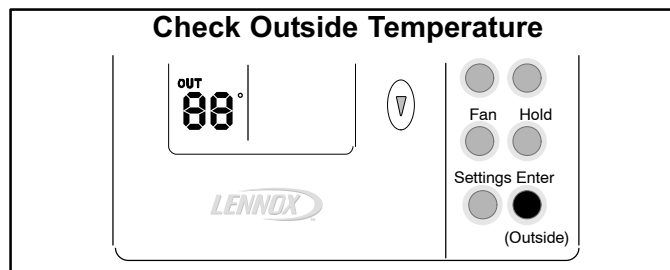


Figure 14

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.

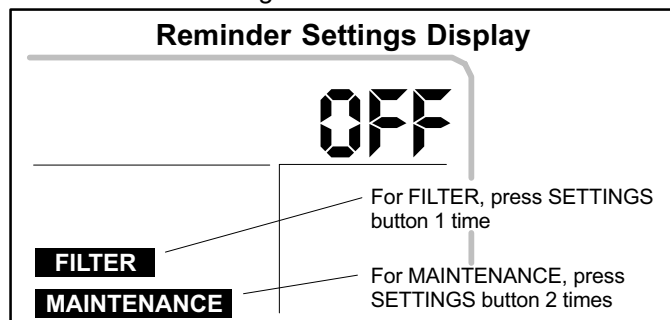


Figure 15

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.

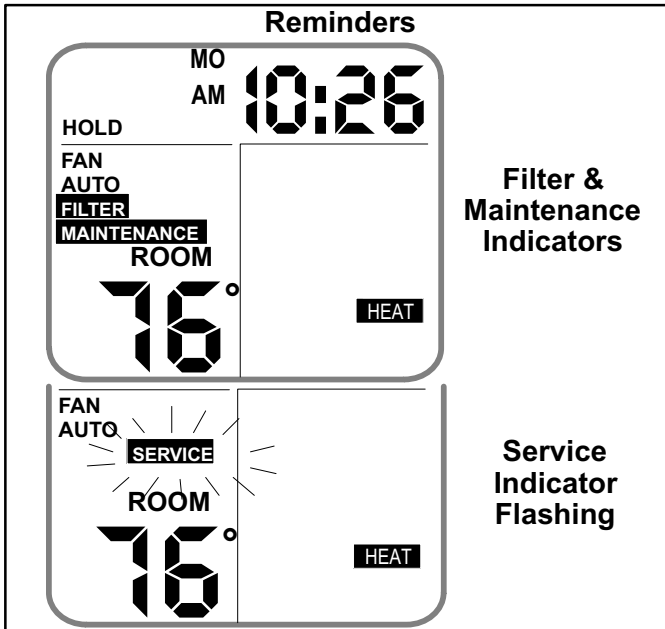


Figure 16

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).

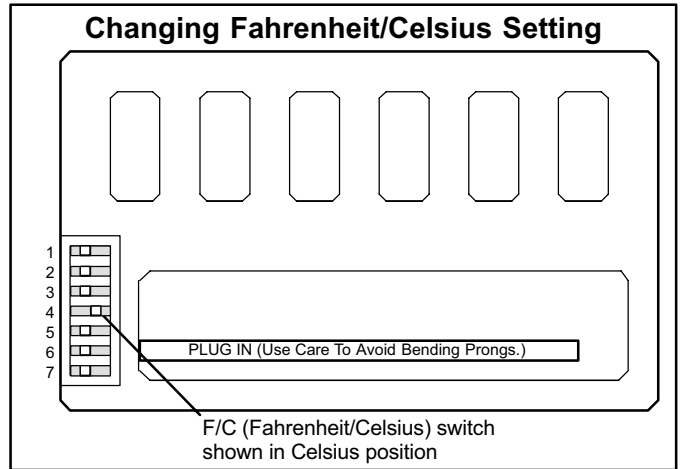


Figure 17

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