

CEM-24 Series

Owner's Manual - Installation
and Operating Instructions



 **Systems
Controls &
Instruments, L.L.C.**



Please read this manual carefully before installation and use.

Index

Options	1
Accessories	2
Installation Instructions	3
Wiring Connections	4
Hardware Jumpers Explanation.....	5
Operating Manual.....	6
Programming	7
Fan/Auto Fan function	8
Override set temperature	9
Unoccupied Mode (set back mode)	10
Reset Button and Alarm Condition (red LED light).....	11
Technician settings	12
Connection of External Sensor	13
To Replace Battery	14
Telephone settings	15
Menu of commands from a telephone to the thermostat	16
Troubleshooting for Technician	17

1. Options

- Programmable or non-programmable: to Select, press one button and the program will remain in memory. (no need to reset it again)
- External Temperature Sensor - (return air or wall mounted)
- High and Low Temperature Alarm - Dry contact
- Alarm for High and Low temperature is only indicated red LED
- Scale in Fahrenheit or Celsius.
- Individual cool and heat set points.
- Fault indication from system (If connected)
- Average Temperature sensing. Please look for details in our web site
- "Sensors & Accessories"

2. Accessories

- Back Plate - 6"L x 4"W x 0.37"H - Part No. WP2.
- Wide Back Plate - 6"L x 6"W x 0.37"H - Part No. WP3.
- Temperature Sensor with 30 inches lead - Part No. TS01.
- Temperature Sensor in decorative box - Part No. RS01.
- Two temperature sensors in a decorative box (for averaging) - Part No. RS02
- Duct temperature sensor - Part No. DT02.
- Outdoor temperature sensor in sealed box - Part No. OS01

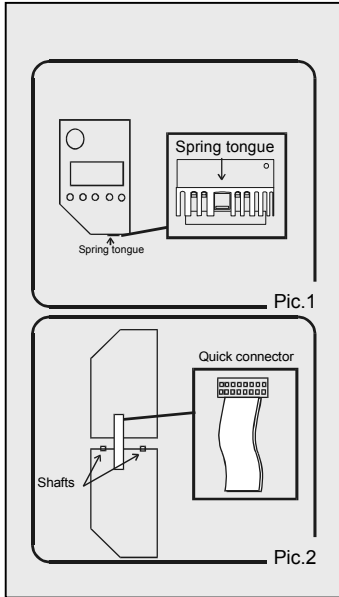


For details on where to purchase accessories, please contact SCI for your nearest location or visit web site as www.scillc.com

3. Installation Instructions



It is recommended to mount the thermostat or return air sensors between 1.5 & 1.8 meters from the floor where possible.



Separate the base from the cover by pressing the tongue (pic.1).

Gently disconnect the cover from the base with quick connector (pic.2)

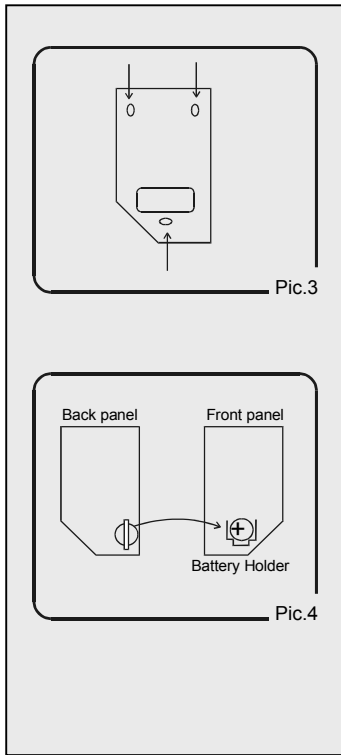
Line the back panel up against the wall or flat surface on which it is to be mounted and drill the appropriate fixing holes (pic.3).

Insert screws so they extend approx. 3/16" (3 mm) from wall or surface.

Align the back panel against these screws, pushing it forward, allowing it to slide downwards to lock into position.

Make electrical connections to terminals on the back panel as shown on enclosed electrical wiring diagram

Reconnect the quick connector.



Attach the cover to the base, first the two shafts and then the spring.

Connect 24Vac to the thermostat; verify that LCD display is ON.



Do not install battery before power is applied.

Remove battery from back panel by sliding it to the left and out from its white retaining clip and mount it in black holder on front panel; insert it from the top, gently pressing downwards until it snaps into place and is held under the top clip of the holder. The '+' engraved on battery should be visible (pic. 4).



Be careful when inserting the battery – the top clip of the holder is very fragile.

Reassemble front and back cover.

Connect at top first then at bottom.

To change jumpers: Disconnect electricity, remove battery and wait 60 seconds



Disconnect power before installing battery

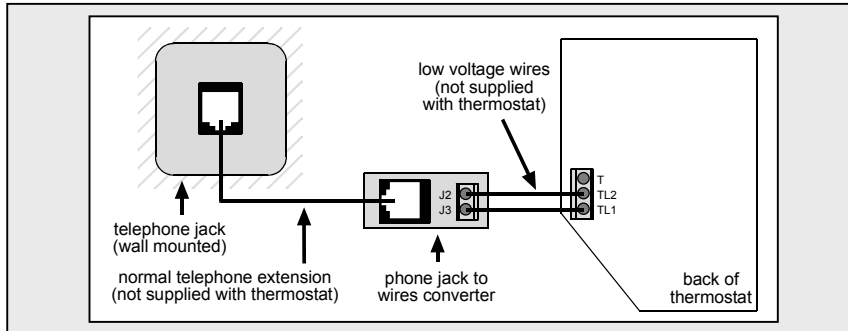
4. Wiring Connections

4.1 Phone line wiring diagram.

The CEM thermostat has a connection for telephone line, exactly like answering machine or a modem, and is connected the same way.

In the thermostat there are 2 terminals for the connection of the telephone line (TL2 and TL1).

The connection for the thermostat has no polarity – each of the wires can be connected to any of the terminals.



📌 If you have the SUPER model - make sure that you choose the right jumper selection. See #5.

📌 Default from factory is HC11.

📌 If you have this application – no need to do anything!



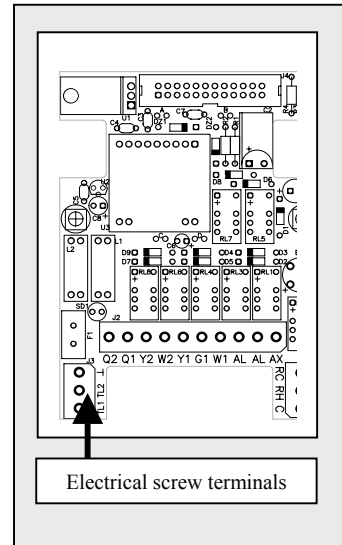
For special types of thermostats the electrical drawing will be added to this manual as an extra page.



Rc-Rh If only one 24 vac supply is being used, Rc-Rh must be connected together

4.2 Connections for all applications

Switch	Function ETN	HC11	HC22	HP21	HP32
Rc	24 Vac RED	X	X	X	X
Rh	24 Vac RED (jumped to Rc)	X	X	X	X
C	24 VAC Common from transformer	X	X	X	X
Y1	Cooling 1 st Stage	X	X	X	X
Y2	Cooling 2 nd Stage	N/A	X	N/A	X
W1 (B/O)	Heating 1 st Stage	X	X	X	X
W2	Heating 2 nd Stage	N/A	X	X (EMH)	X (EMH)
G1	Fan	X	N/A	N/A	N/A
AL,AL	Alarm	X	X	X	X
AUX	Fault input from system	X	X	X	X
Q1	NOT IN USE				
⊥, Q2	Return Air Sensor SEE # 13	X	X	X	X
TL1	Telephone input	X	X	X	X
TL2					

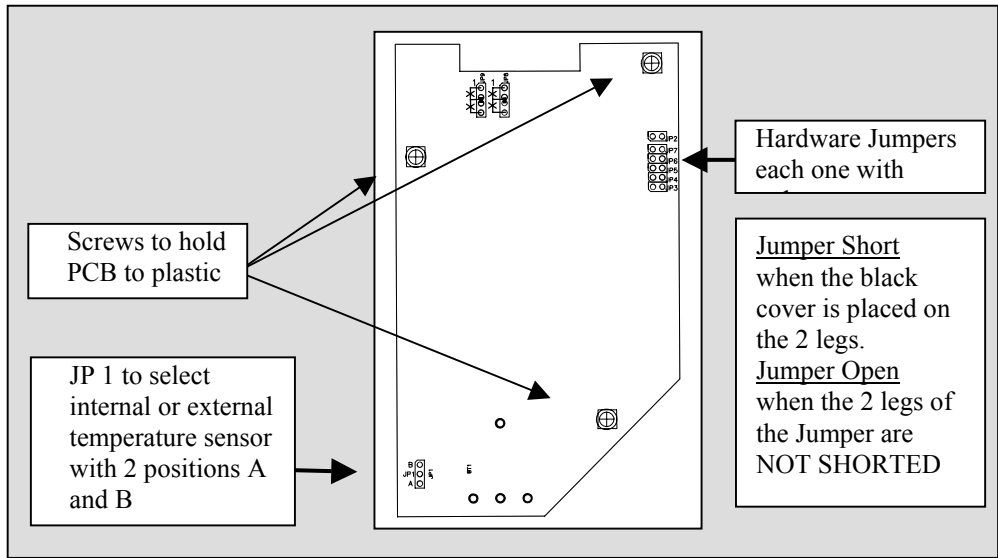




IMPORTANT! Before making any changes in the dipswitch disconnect electricity in the main board.

5. Hardware jumpers and DIP switch Explanations

4.1 The DIPswitch is located in the middle of the board as shown in the drawing.
(Inside the thermostat)



IF you have the SUPER model - Select the configuration of the thermostat.

The options with the jumpers are:

- External sensor
- Relay for compressor
- Clock mode: AM/PM or 24 hours
- Heat pump or non heat pump
- Heat pump active in cool or heat
- Fan mode: electric or oil/gas

This chart will help you select the jumpers:

- HC - (heat, cool) and Fan mode "Oil" or "Electric".
- HP - heat pump and energize in Cool "O" or in Heat "B".

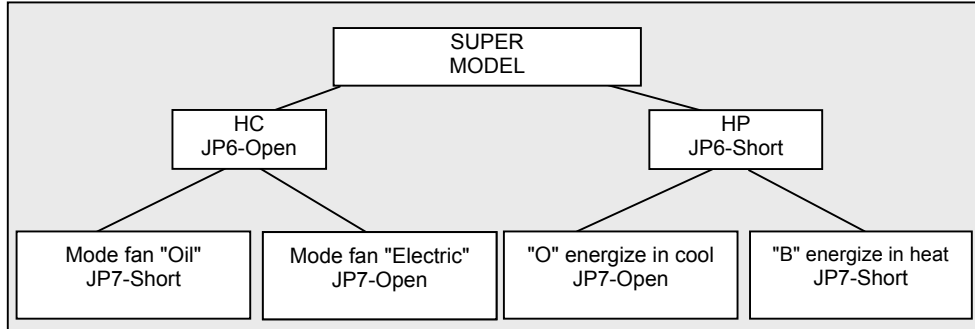


Table 5.1 – Jumper selection

Jumper	Function	Position	Default	
JP1	Internal Sensor Control	Pos. A	X	
	External sensor control	Pos. B		
JP2	NOT IN USE			
JP3	4 minutes delay for compressor	Open	X	
	No delay	Short		
JP4	Clock mode – 24 hours	Open		
	Clock mode – 12 hours (AM/PM)	Short	X	
JP5	NOT IN USE			
JP6	No heat –pump (HC)	Open	X	
	Yes heat-pump (HP)	Short		
JP7	In HC mode: (JP6 Open) Set fan mode	Electric mode – fan will be activated or not - with the button "AUTO FAN"	Open	X
		Oil/Gas mode – Option used when the heating system is different than the A/C unit (i.e. furnace). - Fan on – the fan will work continuously. - Fan off – the fan will NOT WORK continuously.	Short	
	In HP mode: (JP6 Short) Set Heat-Pump energized in cool or heat	Heat Pump energized in cool "O".	Open	X
		Heat Pump energized in heat "B".	Short	

6. OPERATING MANUAL

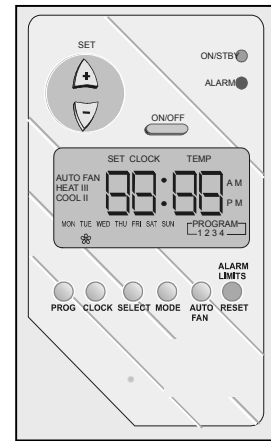
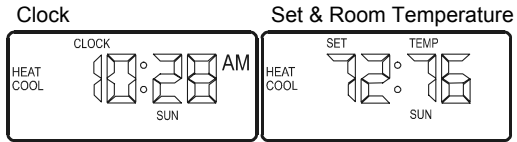
6.1 ON/OFF:

Press ON/OFF button - ON/STBY LED will light and the outputs are now activated.

(To turn off, press and hold ON/OFF for **3 seconds**).

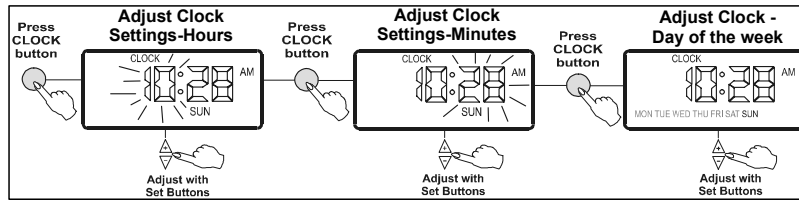
6.2 LCD SCREEN:

The LCD will display two modes in sequence:
Clock, Set & Room Temperature.



6.3 Real time clock and day:

- Adjust the hours: Press clock button; the hour digits will flash.
- Use the set button press (+) to increase and (-) to decrease the hours.
- Adjust the minutes: Press clock button; adjust the minutes.
- Adjust the selected day of the week, press clock again.
- The row of weekdays will flash.
- Adjust the day by pressing the set button (e.g. if Saturday selected, SAT will show in display, etc).
- Press clock again to return to normal display.



6.4 SELECTING MODES:

Press mode button to switch between the four modes:
 COOL ; HEAT ; COOL/HEAT (Auto-change over) ; FAN ONLY.

6.5 SET TEMPERATURE

- Press the SET buttons (+) or (-); the temperature will flash, change with the set buttons (+) or (-).
- In auto-change mode, press the set buttons (+) or (-), COOL and TEMPERATURE will flash
- Set your cooling temperature with (+) or (-) buttons.
- After three seconds, the HEAT and the TEMPERATURE will flash
- Set you heating with (+) or (-) buttons.



**The HEAT SET must be at least 1 degree less than the COOL SET.
 The controller will not let you enter the wrong setting.**

In auto-change mode if the heat set is more than the cool, the system will continually jump from cooling to heating.

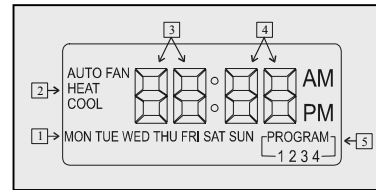
7. Programming

The control is a 5-1-1 programmable: Weekdays - Monday through Friday,
Saturday and Sunday have individual programs.

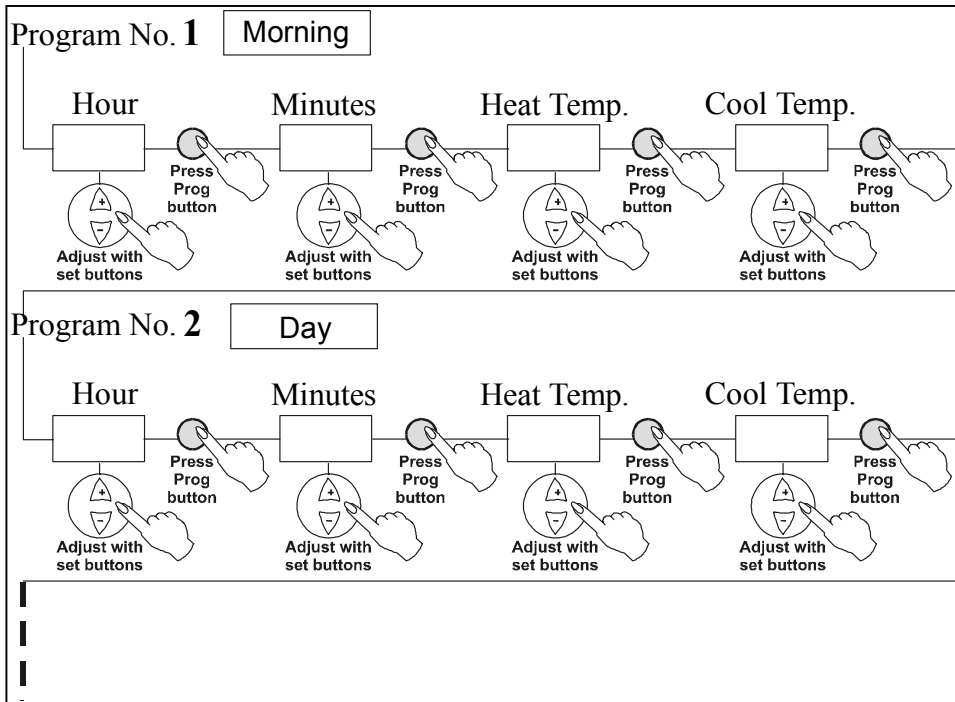
There are four program events per day: Morning; Day; Evening; Night

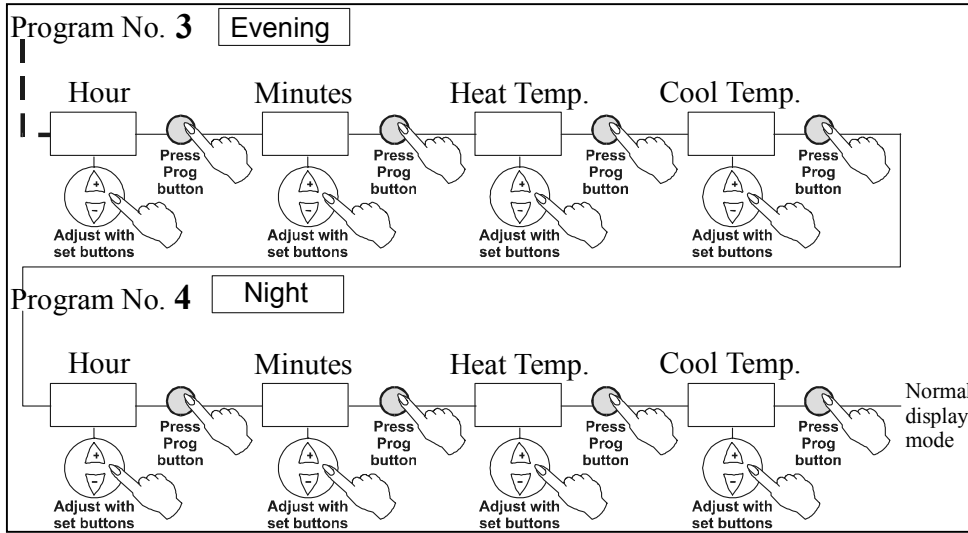
Thermostat Display

1. Days of the week: (when setting the program).
It will display the period that you are setting.
E.g. when display shows: MON-TUE-WED-
THU-FRI, you are setting the weekdays program.
(The program will repeat on each of these days).
2. MODE (heat/cool), will be displayed when you are setting individual temperatures (See # 6.5)
3. Hours digits.
4. Minutes digits.
5. Number of events that you are setting or the current event.



- The following chart will help you make the program.
- We recommend that you fill out the chart BEFORE setting the weekly program.
- On the chart, select a cooling and a heating temperature. This will keep a safe differential between Heat and Cool for auto-change over.
- Display shows: program (weekday, Saturday or Sunday) and event (1, 2, 3, 4)
- During programming, the display will return to normal display if no selections are made in 15 seconds.
- The controller keeps a safe differential of at least 1 degree between Heat set and Cool set. (Heat is always less than Cool).

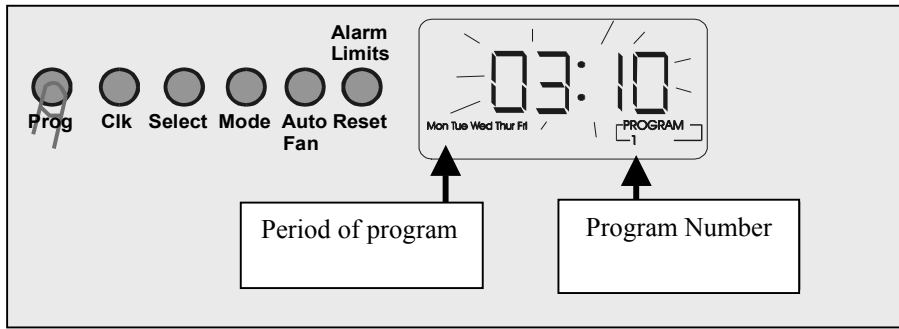




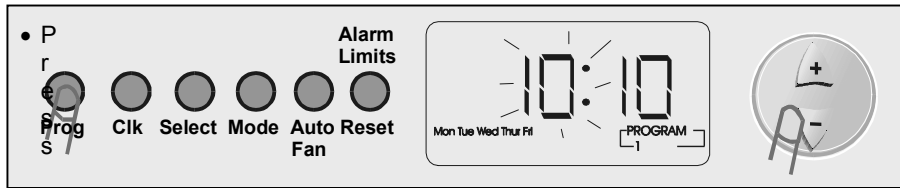
7.1. Setting the Program

Pressing the **PROG** button does all Programming selections

- Press the **Prog** Button - the hours and minutes will flash.
This shows that you are entering the **Prog** mode.

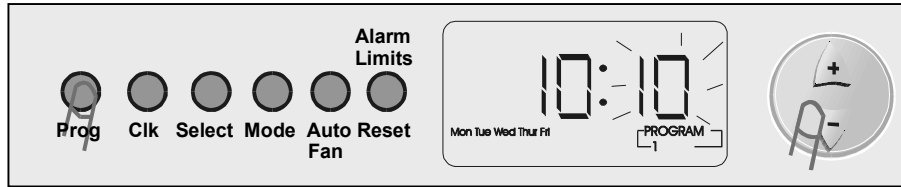


- Press the **Prog** button - the hours on display will flash.
- Change the hours with the **set** buttons: "+" to increase, "-" to decrease.

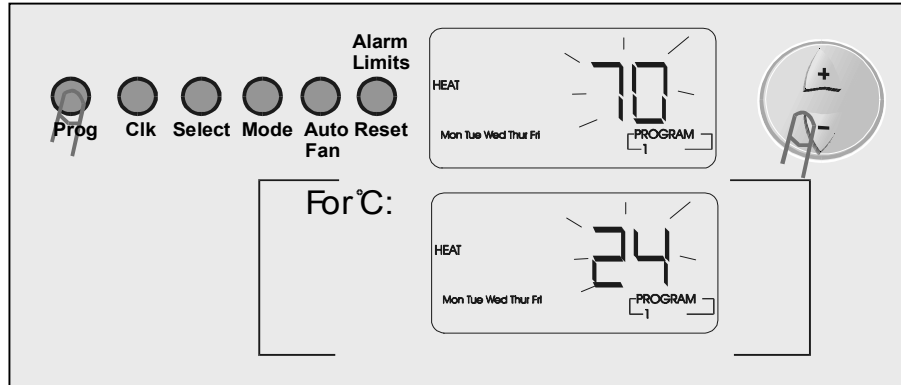


- P
r
e
s
s
- Press the **Prog** button again - the minutes on display will flash.

- Change the minutes with the **set** buttons “+” to increase, “-“ to decrease.

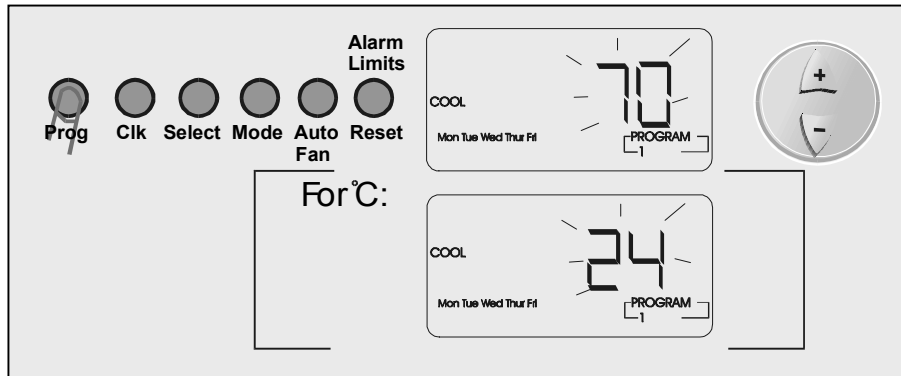


- Press the **Prog** button again - heat and temperature on display will flash.
- Change the heat set with the set buttons “+” to increase, “-“ to decrease.



- Press the **Prog** button again - cool and temperature on display will flash.
- Change the cool set with the **set** buttons: “+” to increase “-” to decrease.

 **The controller keeps a safe differential of at least 1 degree between Heat set and Cool set (Heat is always less than Cool).**



- To set the time and temperature for the other programs repeat the steps above.
- Press **Prog** button to return to normal display.

7.2. Weekly Program Mode and Manual Mode.

You can change between weekly program and Manual program, by pressing and holding (3 seconds) the **PROG** button in normal display. In weekly program the clock symbol and Program, in brackets, will be displayed.

The clock symbol and Program, in brackets, will not be displayed in Manual Mode.

7.3. Review the Program

You can review the program or change part by entering into the program mode and step quickly through by pressing **CLOCK** button.

8. FAN/AUTO FAN function

- Press the **AUTO FAN** button to select AUTO FAN.
- Press again to cancel.
- In AUTO FAN the fan will only run when calling for heat or cool.

9. OVERRIDE SET TEMPERATURE

- At anytime you may change the temperature by pressing the set buttons.
- The new temperature will be retained until the next program start.
- If the thermostat was in program mode, then the number of the program will disappear until the next program.

10. UNOCCUPIED MODE (Set back mode)

Unoccupied mode overrides the set point temperature and uses set economy temperatures for heat and cool when you leave home or office for any period of time - vacation, unexpected event - and the system will work in SET BACK mode.
(To set temperature for unoccupied mode See # 12.6)

10.1 Set the thermostat to work in Unoccupied Mode.

- Switch on the thermostat
- Press and hold AUTO FAN button (3 sec.) until buzzer "beeps" - EC (Economy) will appear in the display.
- When returning home (office) - press and hold (3 sec.) - the AUTO FAN button until buzzer "beeps" and SET TEMP returns to normal.



In Unoccupied Mode, none of the buttons function except Reset.



The green LED will light to show that the thermostat is working but the system may be turned off because there is no demand.

11. Reset Button and Alarm Condition (red LED light)

In case the room temperature goes higher or lower than the set alarm (SEE # 12) - the alarm LED will flash and the alarm output will be activated.

Press and hold the **Reset** button to clear the alarm.

The alarm will clear by itself if the temperature returns to the normal level.

The alarm output works even if thermostat in "OFF" position.

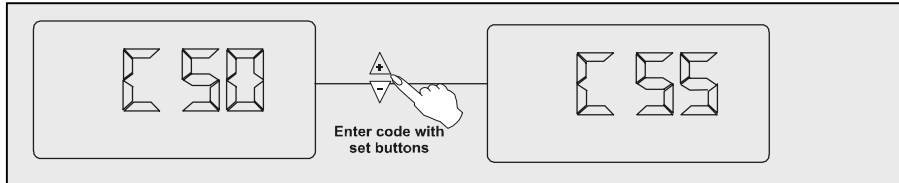
12. Technician settings

These settings permit changes to the following:

- High temperature limit
- Low temperature limit
- High temperature alarm
- Low temperature alarm
- Connecting external sensor
- Connecting outdoor sensor.
- Connecting extra receiver.

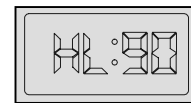
12.1 Enter code for technician

- Press alarm limit button - the display will show (Fig.1):
- Your code is 55. Enter your code by using the set buttons (+, -).



12.2 Set Heat temperature limit - HL:

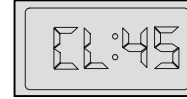
- Press ALARM LIMIT button again the display will show:
- Adjust the heat limit temperature using the set button (This will limit the Max. range of adjusting set temperature). Range 50°-90°F (15°C-35°C).



- Press **ALARM LIMIT** button again.

12.3 Set Cool temperature limit - CL:

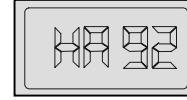
- Press ALARM LIMIT button again - the LCD will show:
- Adjust the low temperature limit using the set button (This will limit the Min. range of adjusting set temperature).
- Range 45°-89°F (10°C-34°C).



The controller will not allow you to adjust cool limit temperature to be higher than heat limit temperature.

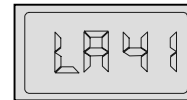
12.4 Set High temperature alarm - HA:

- Press ALARM LIMIT button again - the LCD will show:
- Adjust the temperature using the set button. (from 36°-93°F) (8°C-46°C) so when ambient temperature is reached, the alarm activates. (red light flashes and dry contact alarm, if available, activates).
- Press **ALARM LIMIT** button again.



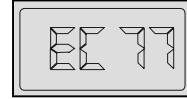
12.5 Set Low temperature alarm - LA:

- Press ALARM LIMIT again for low temperature:
- Adjust the temperature you want (35°-91°F) (2°C-39°C). The unit will not allow you to adjust low temperature alarm to be higher than high temperature alarm.
- Press **ALARM LIMIT** button again.



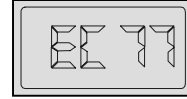
12.6 Set Economy mode - cooling:

- Press again to set Economy Mode for cooling.
(Your setting for unoccupied mode) 75°-90°F (24°C-31°C)



12.7 Set Economy mode - Heating:

- Press again and set Economy Mode for heating
(Your setting for unoccupied mode) 36°-60°F (5°C-15°C)



13. Connection of External Sensor



Important! The external sensor must be SCI type.

N.TC. Sensor: Temperature ~ Resistance Characteristics

Temp °C	7.2	10.0	12.8	15.6	18.3	21.1	23.9	26.7	29.4	32.2
Temp °F	45	50	55	60	65	70	75	80	85	90
Res. k	115.8	100.9	88.1	77.1	67.7	59.6	52.5	46.4	41.2	36.6

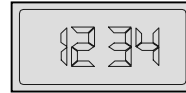
- Disconnect power to the thermostat 24 Vac.
- Move Jumper 1 to position B. see # 5.9
- Connect the temperature sensor to T1-T1 terminals.
- Reconnect power 24 Vac.

14. To Replace Battery

- Leave controller under 24V open the front cover (see installation instructions)
- Replace battery (3V lithium battery -200MAH)

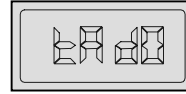
15. Telephone settings

Press the **SELECT** button - A four (4) digit code number password will appear 1 2 3 4. (Default from factory)



- Select a code number, which is easy to remember (four digits).
- Press the (+) increase or (-) decrease buttons to change the first number.
- Press **SELECT** again to change the second number with (+, -) buttons.
- Change the third and fourth number in the same way.

- Press the **SELECT** button again - TAD 0 appear in LCD.
- Choose between TAD 0 or TAD 1 with the set (+, -) buttons.



TAD 0 = The unit will work in normal mode.

TAD 1 = This feature allows the unit to be connected to another device on the same telephone line, such as, elec. answering machine, fax, etc.

With this option you must call the thermostat two times.

First of all, you must know set number rings for another device.

Number of rings for the controller must be more than number rings for another device.

Each attempt must be with number rings less than number rings for another device.

Controller answers if it hears the set number of rings within 30 seconds after first attempt.



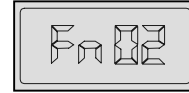
We recommend a minimal number of rings for the controller - 3.

E.g. Number rings for Electric answering machine is equal four.
Number rings for the Controller equals six rings.

Follow these steps:

1. Set the ring setting to six rings.
2. Call the controller.
3. Let the telephone ring three times and hang up.
4. Wait for 4-5 seconds, and call again within 30 seconds last from hang up.
5. The controller will answer after the third ring on the second call, but before any other device.

- Press the SELECT button again - Fn 02 will be displayed.
This is the number of rings which you want before the control answers the telephone. It is recommended that you have the telephone ring at least 6 times. This will give you time to answer the telephone and preventing the call from going to the control.

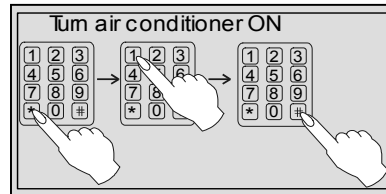


16. Menu of commands from a telephone to the thermostat

- Enter your password: 1•2•3•4•# (factory default - or any other code you have chosen 4 numbers only)

You will hear the status of the A/C:

- a. The temp in the room is...
- b. The air - conditioner is ON (or OFF)
- c. The Air-conditioner is in mode (cool, heat, fan, auto change over)...
- d. Set temp is...



- Enter your desired command as follows:

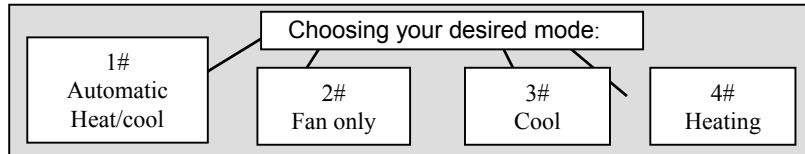
*1#: Turn the air conditioner ON

*2#: Turn the air conditioner OFF

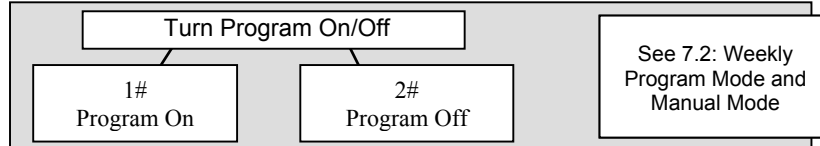
*3#: Adjust the desired temperature for cooling: Press the required temp - e.g. 72#

*4#: Adjust the desired temperature for heating: Press the required temp - e.g. 71#

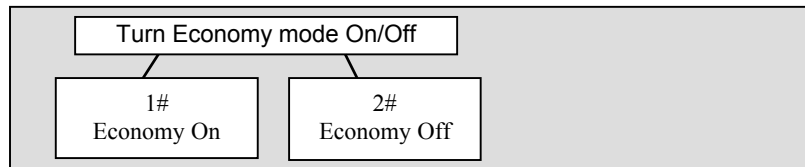
*5#:



*6#:



*7#:



0#: menu of commands.

👉 In each step exit or finish press *9#

👉 At the end of each session you should press *9# to save the new commands.

17. Troubleshooting for Technician

Problem	Solution
The display does not light	The unit is not getting 24 Vac - Check the wiring connections, Rh (Phase for heat), Rc(Phase for cool), C(common). If you are using one phase for cool and heat, check that the short between Rc, Rh and common is tight.
Temperature in the room (display) dropped to 32°	The temperature sensor is sensing an OPEN CIRCUIT. Replace the jumper JMP1. If the temperature returns to normal - there is a problem with the external sensor.
Temperature in the room (display) rises to 87°	The temperature sensor is sensing a SHORT CIRCUIT.
Cool stages do not switch on	Check the Rc connection.
Heat stages do not switch on	Check the Rh connection.
The unit does not respond to buttons and "EC" appears in the display	The unit is in Unoccupied Mode. To return to normal mode, see #10.
In heat mode, unit sends cool air	The Auto Fan is not ON.



SCI - Systems Controls & Instruments can offer a WIDE range of products for the HVAC industry

Such as :

- Flush Mount Thermostats - Programmable and Non-Programmable.
- HVAC Analyzer that can measure BTU's, for technicians.
- Tamper proof thermostats that can be operated ONLY from the remote control, for public places.
- Thermostat with phone communication; listen to your thermostat from ANYWHERE and change settings.

For trial please dial: 1-877-662-0660

Password 1,2,3,4,# for Menu *,0,# ...

To obtain more information or technical support:

Tel : 1-800-663-8107. E-mail : support@scilic.com Web site: www.scilic.com

Your suggestions or comments regarding these units would be appreciated.

At our web site, you can find technical details regarding the units, as well as, operating manuals, electrical drawings, Etc.

The company reserves the right to change the specifications any time without prior notice

REV 4