

# INSTALLATION AND OPERATING INSTRUCTION MANUAL FOR MODEL LLC-C LEAD-LAG TEMPERATURE CONTROLLER

## BASIC DESCRIPTION

The LEAD-LAG temperature controller is an all-solid-state device which regulates one or two heating/cooling systems to provide temperature control. If connected to two units, it can be set to periodically alternate between the units over a period of time to ensure equal usage and maximum life. The controller can be programmed to alternate between units every 1, 3, 7, 14 or 28 days. The controller can operate two stages of heating and cooling. In the event a single unit cannot meet the heating or cooling demand, the other unit is brought on line to assist. First-stage heating and cooling operates with a four-degree temperature swing. An additional two-degree swing will activate the second stage. This decreases the number of times the units are cycled, increasing system life and efficiency. The controller also may be programmed to operate one or two units without alternating between units (0 day setting). An internal short-cycle delay of three minutes for the first stage and four minutes for the second stage is provided to ensure adequate refrigerant pressure equalization before restarting a compressor. Since the temperature controller circuitry is solid-state, the controller is neither position- nor vibration-sensitive and need not be level for proper operation. The user may adjust the dead-band as well as the temperature. Dead-band is the temperature range over which neither heating nor cooling is necessary. The band is adjustable from zero through twenty degrees Fahrenheit (0° F.–20° F.)

The controller, if used to regulate two units, will isolate the transformer of one unit from the transformer of the other unit. One side of each control transformer is connected to common, and the other side is protected against “back-feeding.”

If power to the units is interrupted, the controller will “remember” which unit is operating and continue the previous sequence of operation after power is restored.

## NOTES TO INSTALLER

The words “SHALL” and “MUST” indicate a requirement which is essential to satisfactory and safe product performance. The words “SHOULD” and “MAY” indicate a recommendation or advice which is not essential and not required, but which may be useful or helpful.

These instructions are for the use of qualified individuals specially trained and experienced in installation of this type of equipment and related system components.

Installation and service personnel are required by some states to be licensed. Persons not qualified SHALL NOT install this equipment nor interpret these instructions.

This installation and maintenance manual is provided to ensure the proper installation and satisfactory performance of your equipment. The instructions contained herein SHALL NOT be deemed to extend, modify, alter or expand any of the representations contained in the limited warranty plan.



**WARNING: Improper installation may damage equipment, can create a hazard, and will void the warranty.**



**DANGER: Before performing any work on this equipment, be sure the electrical power supply is turned “OFF” at the service box to avoid the possibility of shock, injury or damage to equipment.**

## INSPECTION AND UNPACKING

A thorough inspection of the shipping container should be made immediately upon receiving your unit. Look for any punctures or openings. If it appears damage has occurred, it should be noted on the freight bill before signing. The delivering carrier should be contacted immediately to inspect damage. No installation work should begin until this inspection is completed.

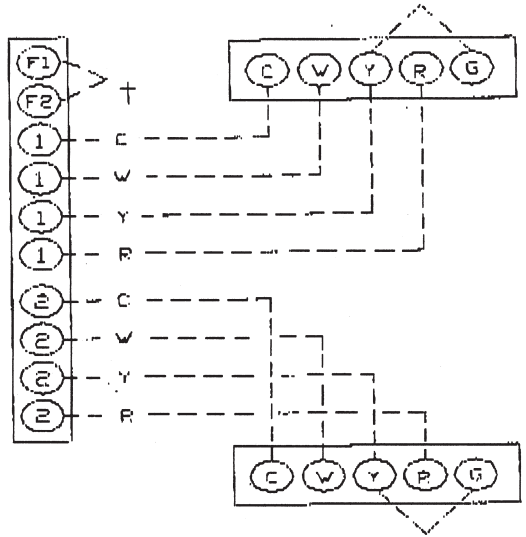
## CODES

The installer SHALL comply with all local, state and federal codes and/or regulations pertaining to this type of equipment and its installation. Such codes and/or regulations should take precedence over any recommendations contained herein, in lieu of local codes. Installations SHALL be made in accordance with the National Electrical Code and recommendations made by the National Board of Fire Underwriters.

# INSTALLATION

Locate the controller in a ventilated area, away from heat-producing equipment, to enable it to make an accurate assessment of room temperature. Remove the screws at each end of the cover to gain access to the mounting holes inside. Attach the controller to the wall with appropriate fasteners. Once the controller is securely fastened to the wall, the low-voltage wiring should be routed in through one of the 7/8" conduit knockouts. Use the diagram provided below for low-voltage wiring. A small flat-head screwdriver is required to attach the wires to the terminal strip. Strip each of the wires approximately 1/4". Insert the bare portion of the wire from the right-hand end, and tighten the screw to secure the connection. When installing two units to the controller, the top four connections are for the #1 unit and the bottom four connections are for the #2 unit. In the absence of a second unit, use only the top #1 connections. If a blower control wire ("G") is used, it should be connected to the "Y" terminal along with the wire from the unit "Y" terminal. "G" may also be jumped to "Y" at the unit.

**WIRING DIAGRAM**  
LEAD-LAG CONTROLLER  
LOW-VOLTAGE  
WIRE CONNECTIONS



**Unit #1**

**Unit #2**

## OPERATION

### LEAD-LAG CONTROLLER PROGRAMMING

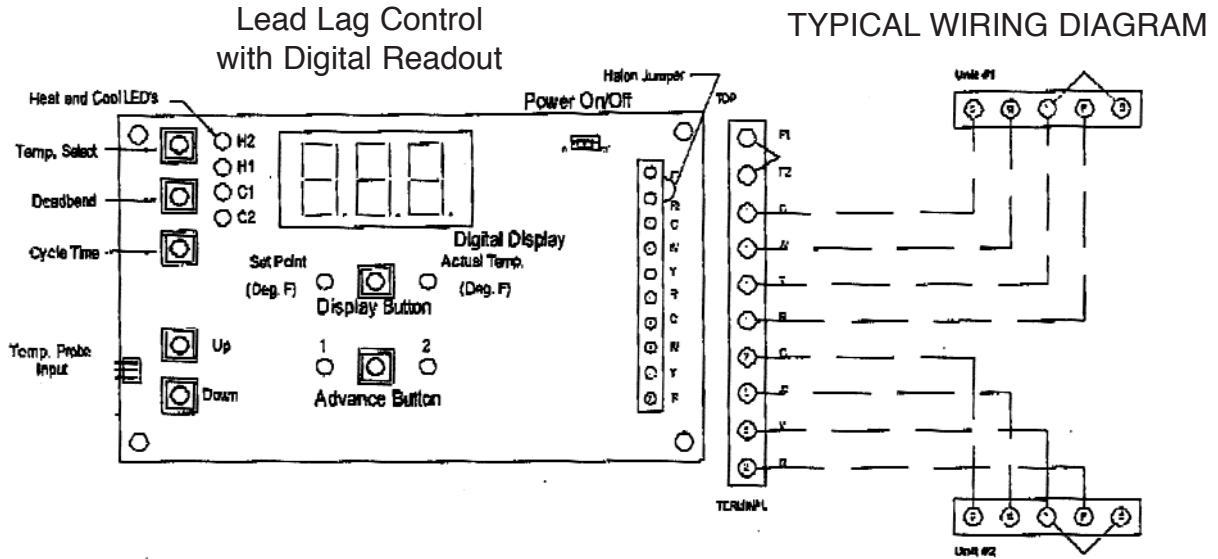
<b>SYSTEM ON/OFF</b>	Used to power up or shut down both systems. Controls low-voltage circuits only. Line voltage will remain live with system switch in the "Off" position. A pointed object is needed to reach this switch as it is recessed inside the controller casing. This is done to prevent accidental switch operation.
<b>DISPLAY</b>	Used to alternate the digital display between actual ambient temperature and the set point temperature.
<b>ADVANCE</b>	Used to advance the lead unit from one unit to the other.
<b>TEMP. SELECT</b>	Used to set the set point temperature. This button <b>MUST</b> be pressed and held while pressing the "Up" or "Down" buttons to display the desired set-point temperature.
<b>DEAD-BAND</b>	Used to set the dead-band. This button <b>MUST</b> be pressed and held while pressing the "Up" or "Down" buttons to display the desired dead-band.
<b>CYCLE TIME DAYS</b>	Used to adjust the cycle time (in days) for changing the lead-lag unit. This button <b>MUST</b> be pressed and held while pressing the "Up" or "Down" buttons to display the desired cycle time. For no change-over or one unit operation, select the 0 day setting.

## SERVICE FUNCTIONS

<b>TEST MODE</b>	For trouble-shooting, the controller can be put into a test mode. This is done to accelerate the timing function. Press and hold the "Advance" button, then press the "Cycle Time" button. This will put three dots on the display. Repeat this step to return to normal operation; the dots should be removed from the display. <b>(DO NOT use test mode while units are wired to run unless the cycle time is set on the "0" setting. Rapid unit changeover will occur, short-cycling the units.)</b>
<b>SENSOR CALIBRATION</b>	The controller is calibrated when shipped from the factory; but if calibration is needed in the field, it can be done as follows. Use a temperature probe to obtain an accurate temperature reading at the lead-lag sensor. Adjust the set point to match the temperature measured by the probe. Then press and hold the display button for 10 seconds until the display blinks off, then on. The controller will then be calibrated to match the measured temperature.
<b>SAFETY SYSTEM HALON CONTACTS</b>	Used to shut down the systems in case of fire or other emergency. These two connections are normally closed with a factory jumper. To use this feature, remove the jumper and connect the terminals to the normally-closed contacts of an output module of a safety system (halon) control panel; when opened, this feature disconnects the low-voltage signal from the lead-lag controller to shut down the units, aiding in fire suppression. This feature may also be used for energy-management systems.
<b>ACCESSORY 15-FT. SENSOR LEAD</b>	A 12-inch sensor lead is provided with the controller. If a longer lead is needed for remote sensing, a 15-foot lead is available. Part No. 0411-0020 should be ordered.

# SPECIAL FEATURES

THE LLC-C LEAD-LAG IS EQUIPPED WITH ONE REMOTE 12" TEMPERATURE SENSOR.



## LEAD-LAG CONTROL

**TEMP. SELECT**

**DEADBAND**

**CYCLE TIME (DAYS)**

**CHANGE SETTING**

**UP**

**DOWN**

**MODEL LLC-C**

**SYSTEM**

ON  OFF

**OPERATION:**  
Refer to the installation instructions for detailed information

1. Turn system switch to the ON position.
2. Set temperature control display to desired temperature.
3. Display button enables display to show set point and actual room temperatures. Light will indicate which temperature is being displayed.
4. The rotation may be advanced by pressing the advance button. The light will show lead unit.
5. The stage 1 and stage 2 lights will indicate whether 1st and 2nd stage heating or cooling is in use.
6. There is an anti-short cycle 3-minute time delay for stage 1 and an additional 1 minute time delay between stages 1 and 2 for either heating or cooling modes of operation.
7. See Operator's Manual for operation details.