

INSTALLATION INSTRUCTIONS

DRA DIGITAL ELECTRONIC TEMPERATURE CONTROL

PRODUCT DESCRIPTION

The Process Technology model DRA is a micro-processor-based electronic temperature control designed to provide on/off control for general aquaculture service. The DRA is equipped with a liquid crystal display (LCD) that provides a constant readout of the sensed temperature, and a touch keypad that allows the user to easily and accurately select the setpoint temperature, differential and heating/cooling mode of operation.



FEATURES

- Wide setpoint temperature range (-30°F to 220°F) and differential adjustment (1°F to 30°F).
- Simple keypad programming of setpoint temperature, differential and cooling/heating modes.
- LCD readout of sensor temperature, control settings, relay status and on-board diagnostics.
- Remote temperature sensing up to 400 feet.
- SPDT output relay.
- User-selectable Fahrenheit/Celsius scales.
- Lockout switch to prevent tampering by unauthorized personnel.

SPECIFICATIONS

Input Voltage 120 or 208/240 VAC, 50/60 Hz
 Temperature Range -30°F to 220°F
 Differential Range 1°F to 30°F
 Switch Action SPDT
 Sensor Vinyl covered thermistor, 2 in. long
 x 0.25 in. diameter with 8 ft. cable

Relay Electrical Ratings

	120V	208/240V
NO Contact		
Resistive amps	15 A	8 A
Horsepower	1 hp	1 hp
NC Contact		
Resistive amps	5.8 A	2.9 A
Horsepower	1/4 hp	1/4 hp

Pilot Duty: 125 VA at 120/208/240 VAC

Control Ambient Temperature

Operating -20°F to 140°F (-29°C to 60°C)

Storage -40°F to 176°F (-40°C to 80°C)

Ambient Humidity 0 to 95%, RH, Non-condensing

Enclosure NEMA 1, Plastic

Agency Approvals Pending

OPERATION

Liquid Crystal Display (LCD)

The LCD display provides a constant readout of the sensor temperature and indicates if the output relay is energized. When the S1 annunciator is constantly illuminated during operation, the relay is energized. The display is also used in conjunction with the keypad to allow the user to adjust the setpoint temperature, differential and heating/cooling modes.

Control Setup

The temperature setpoint refers to the temperature at which the normally open (NO) contacts of the output relay will open. Determine the load(s) to be controlled and the operating mode required, cooling or heating. Refer to Figure 1 for a visual representation.

- When the cooling mode is chosen, the differential is above the setpoint. The relay will de-energize as the temperature falls to the setpoint.
- When the heating mode is chosen, the differential is below the setpoint. The relay will de-energize as the temperature rises to the setpoint.

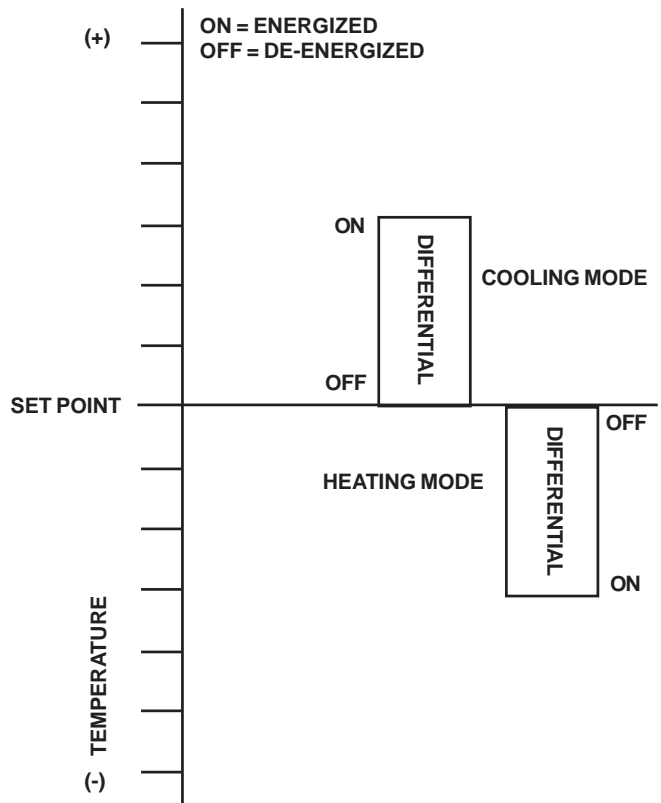


Figure 1: **Setpoint and Differential Settings.** Diagram indicates relay on and off points in either the heating or cooling modes.

Programming Steps and Display

The DRA can be programmed in four simple steps using the LCD display and the three keys on the face of the control.

Step 1- To start programming, press the **SET** key once to access the Fahrenheit/Celsius mode. The display will show the current status, either **F** for degrees Fahrenheit or **C** for degrees Celsius. Then press either the up **↑** or down **↓** arrow key to toggle between the **F** or **C** designation.

Step 2- Press the **SET** key again to access the setpoint. The LCD will display the current setpoint and the **S1** annunciator will be blinking on and off to indicate that the control is in the setpoint mode. Then press either the up **↑** key to increase or the down **↓** key to decrease the setpoint to the desired temperature.

Step 3- Press the **SET** key again to access the differential. The LCD will display the current differential and the **DIF 1** annunciator will be blinking on and off to indicate that the control is in the differential mode. Then press either the up **↑** key to increase or the down **↓** key to decrease the differential to the desired setting.

Step 4- Press the **SET** key again to access the cooling or heating mode. The LCD will display the current mode, either **C1** for cooling or **H1** for heating. Then press either the up **↑** or down **↓** key to toggle between the **C1** or **H1** designation. Press the **SET** key once more and programming is complete.

Step	Annunciator	Description	Display
1	F or C	Fahrenheit or Celsius	
2	S1 (blinking)	Setpoint Temperature	
3	DIF 1 (blinking)	Differential Temperature	
4	C1/H1	Cooling or Heating Mode	

NOTE: The DRA will automatically end programming if no keys are depressed for a period of thirty seconds. Any settings that have been input to the control will be accepted at that point.

All control settings are retained in nonvolatile memory if power to DRA is interrupted for any reason. Reprogramming is not necessary after power outages or disconnects unless different control settings are required.

Lockout Switch

The DRA is provided with a lockout switch to prevent tampering by unauthorized personnel. When placed in the **LOCK** position, the keypad is disabled and no changes to the settings can be made. When placed in the **UNLOCK** position, the keypad will function normally.

To access the lockout switch, disconnect the power supply and open the control. The switch is located on the inside cover about 2 inches above the bottom (see Figure 2). To disable the keypad, slide the switch to the left **LOCK** position. To enable the keypad, slide the switch to the right **UNLOCK** position. All DRA controls are shipped with this switch in the **UNLOCK** position.

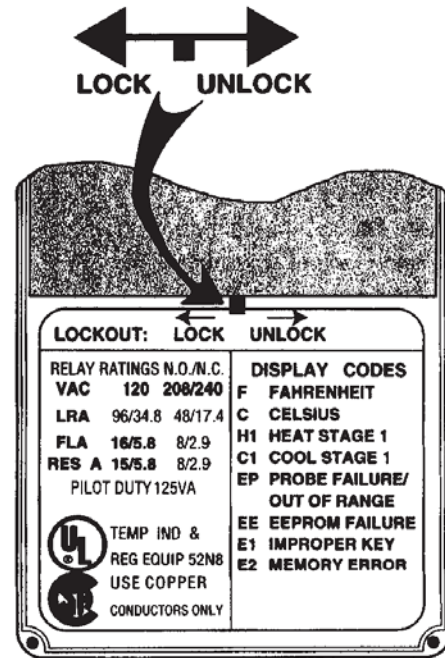


Figure 2: Lockout Switch

TROUBLESHOOTING ERROR MESSAGES

Display Messages

- E1 - Appears when either the up **↑** or down **↓** key is pressed when not in the programming mode.
To correct: If the E1 message appears even when no keys are being pressed, replace the control.
- E2 - Appears if the control settings are not properly stored in memory.
To correct: Check all settings and correct if necessary.
- EP - Appears when the probe is open, shorted or sensing a temperature that is out of range.
To correct: Check to see if the sensed temperature is out of range. If not, check probe following "Probe Troubleshooting Procedure" outlined on the DRA-8L Probe Data Sheet.
- EE - Appears if the EEPROM data has been corrupted.
To correct: This condition cannot be field repaired; replace the control.
- CL - Appears if calibration mode has been entered.
To correct: Remove power to the control for at least five seconds. Reapply power. If the CL message still appears, replace the control.

INSTALLATION INSTRUCTIONS

IMPORTANT

1. All DRA series controls are designed as operating controls only. If an operating control failure could result in personal injury or loss of property, a separate safety control and/or alarm must be installed.
2. The schematic drawings and other information included in these installation instructions are for the purpose of illustration and general reference only.
3. These instructions do not expand, reduce, modify or alter the Process Technology Terms in any way; and no warranty or remedy in favor of the customer or any other person arises out of these instructions.
4. Process Technology DRA controls have been submitted to Underwriter's Laboratories for UL listing; however, this does not extend to their use for any other purpose. Process Technology assumes no responsibility for any unconventional application of its control unless such application has been approved in writing by Process Technology.
5. It is the responsibility of the installer and the user to assure that his or its application and use of all Process Technology products are in compliance with all federal, state and local requirements, including, without any limitation, all requirements imposed under the National Electric Code and any applicable building codes.

CAUTION

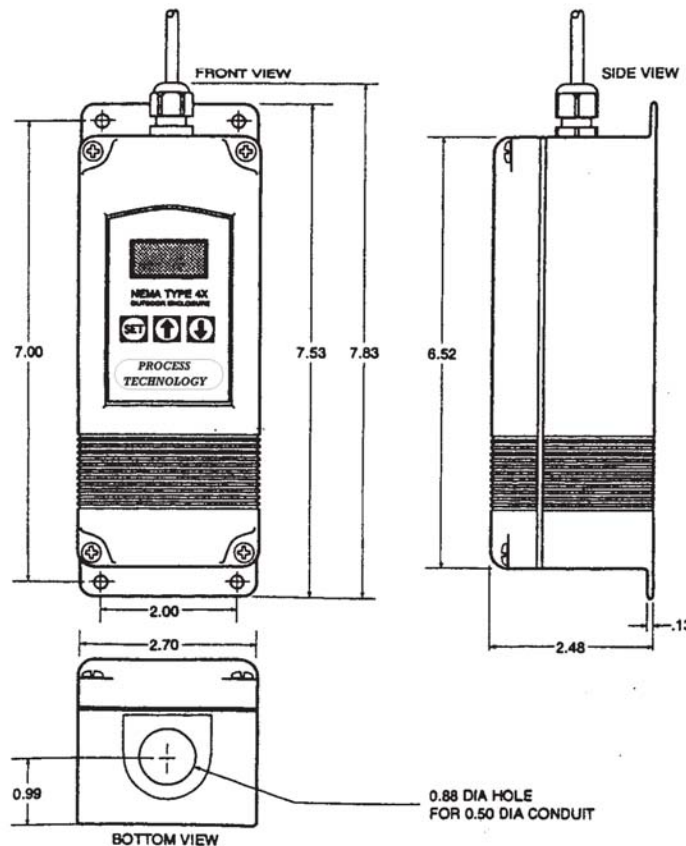
To prevent possible electrical shock or equipment damage, disconnect electrical power to the unit before and during installation. DO NOT restore electrical power to unit until the control is properly installed and the cover is assembled. DO NOT locate the control in an explosive atmosphere, as a safety hazard can result due to possible spark generation in the control. Controls are not to be located in areas of significant moisture, dirt or dust, or in a corrosive explosive atmosphere. Use of control in such environments may result in injury or damage to the persons or property (or both) and are likely to shorten the control life;

Process Technology assumes no responsibility for any such use.

CONTROL MOUNTING

Mount the DRA to a wall or any flat surface using a combination of any two or more of the holes located on the control case. The control's components are not position-sensitive, but should be mounted so that they can easily be wired and adjusted. Avoid excessive conditions of moisture, dirt, and corrosive atmospheres.

The DRA has provisions for 1/2 inch conduit connections. The conduit hub should be secured to the conduit before securing the hub to the plastic housing of the control. Caution should be exercised not to damage the control circuit board or wiring when installing a conduit connector.



CONTROL WIRING

General

- All wiring should conform to the National Electric Code and local regulations.
- The total electrical load must not exceed the maximum rating of the control (see Specifications).
- Use copper conductors only.
- Electrical leads should not be taut; allow slack for temperature change and vibration.

Input and Output Wiring

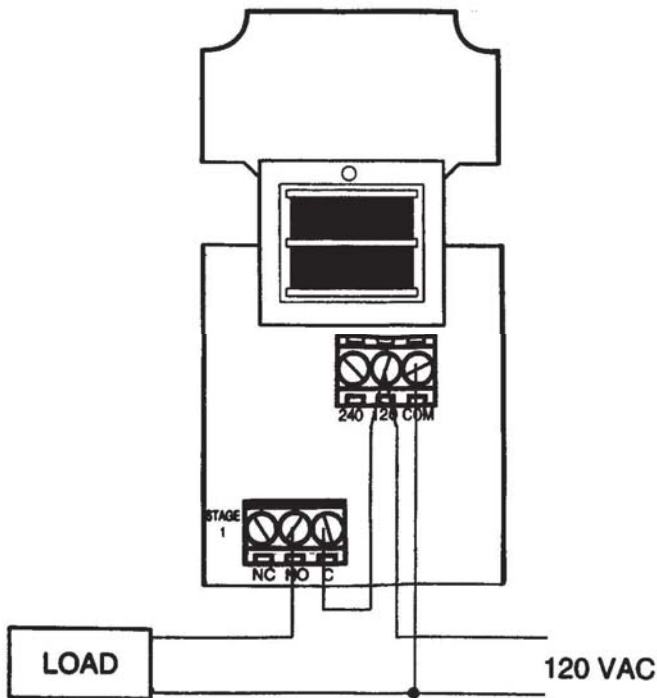
For typical heater wiring, see below.

All connections are made to the power (lower) circuit board.

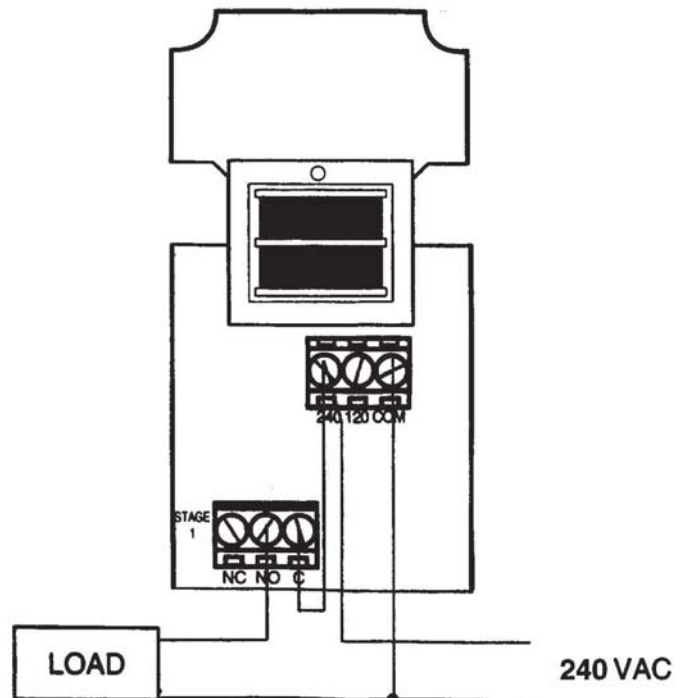
Sensor Wiring

The temperature sensor leads are soldered to the circuit board so no additional connections are necessary. However, splicing is required when extending the sensor cable length beyond the standard 8 foot length supplied with the DRA. The sensor cable can be extended up to 400 feet.

A damaged sensor can be replaced by splicing a new DRA-8L sensor onto the sensor leads from the circuit board. The sensor is not polarity sensitive.



Typical 120 VAC Wiring Diagram



Typical 240 VAC Wiring Diagram

CAUTION: To reduce the risk of electric shock injury, all temperature controls and heaters must be connected to a suitably sized fused disconnect and GFCI circuit capable of breaking all power supply lines.

**PROCESS
TECHNOLOGY**

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M-33-03 DRA Manual Printing Instructions

Print two-sided on 11" x 17" 24lb paper and fold into "booklet"