HEAT CONTROL BOX

MODEL UC-200 HEAT CONTROL BOX

OPERATING INSTRUCTIONS

CHEMINSTRUMENTS

510 COMMERCIAL DRIVE

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PRODUCT DESCRIPTION

Congratulations on the purchase of your new ChemInstruments UC-200 Heat Control Box. The UC-200, Universal Coating Head, when used with the Heat Control Box provides a coater that allows for coating hot melt adhesives on any substrate without having to use the large quantities necessary for production equipment.

Warning: This equipment can cause injury if not used properly. It is the operator's responsibility to observe all safety rules and warnings.

The Heat Control Box has the following features:

- Separately heated coating bars and back dam.
- Can use "pre-melted" adhesives or the coater can melt the adhesive.
- Three temperature controllers with digital read-outs.
- Each heating rod has its own internal thermocouple.
- Heating elements connect to the control box with individual 36 inch (1 meter) stainless steel armored cables.

SPECIFICATIONS

Electrical	120 VAC, 50/60 Hz, 15 amps or 240 VAC 50/60 Hz, 8 amps
Reservoir Temperature	Up to 400 degrees Fahrenheit (204 degrees Celsius)
Heating Rods	500 watt each
Physical Dimensions Control Box	Width: 16 inches (41 centimeters) Depth: 9 inches (23 centimeters) Height: 9 inches (23 centimeters) Weight: 17 pounds (8 kilograms)

UNPACKING

ChemInstruments has made every effort to ensure that the Heat Control Box arrives at your location without damage. Carefully unpack the instrument and check for any damage that may have occurred during shipment. If any damage did occur during transit, notify the **carrier** immediately.

Make sure all of these components are present before discarding the packaging material.

- Control box with 3 heating rods coming from back panel.
- One heat control Instruction Manual.
- An envelope with this manual.

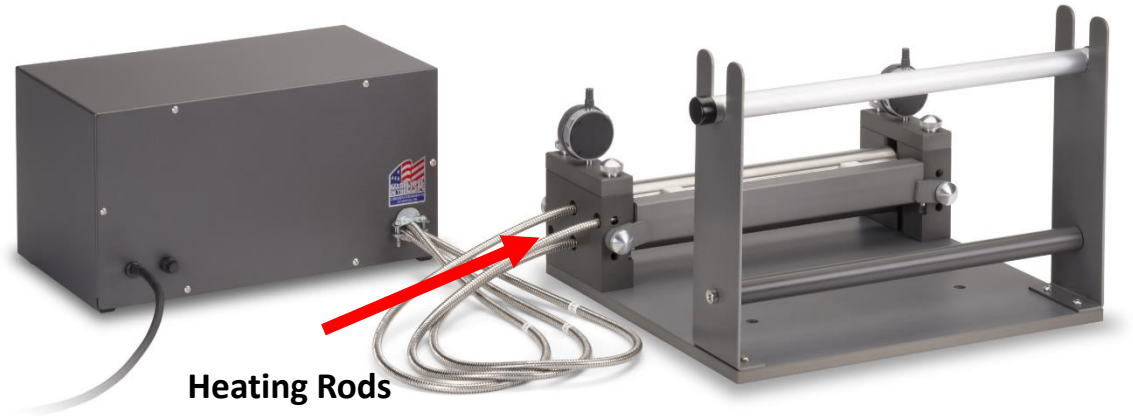
NOTE: The Heat Control Box has been fully factory tested and is ready for operation. There is no need to program the temperature controllers. The instruction manual is included only as a reference for customers with special applications.

ASSEMBLY

The heating rods will need to be inserted into the coating head before use.

Slide the heating rods into the holes in the side plate of the coating head. The rods can be inserted from either side of the coater. One rod should go into each of the following places: top coating bar, bottom coating bar, and reservoir/back dam. The rods are labeled and should be placed in the appropriate location. The individual heating controllers are labeled to match the heating rods. Proper placement of the heating rods is important.

NOTE: The heating rods may be discolored due to final testing at our factory.



THEORY OF OPERATION

The Heat Control Box is used with the UC-200 for the quick and easy application of elevated temperature or hot melt coatings. The Heat Control Box has the ability to heat each coating bar and the reservoir separately. This offers a greater range of control and diversity for your applications.

The coater can use pre-melted adhesives or the reservoir can melt the adhesive. If using the reservoir to melt the adhesive, be aware of the melting point and possible damage to the substrate.

POWER UP

Turn power on with the master switch located on the front panel of the Heat Control Box.

Warning: Operating temperature for this equipment is 0 to 70 Celsius. The equipment needs to be completely free of condensation, inside and out, before applying power.

Warning: Make sure the power source matches the requirements of the Heat Control Box. Damage will occur if this unit is plugged into the incorrect power supply.

TEMPERATURE CONTROLLER OPERATION

The heating controllers are preset and tested at the factory before shipment. They are ready to begin operating as soon as the power switch is turned on.

The actual temperature of the coating bars or back dam are the process values and are displayed on top of each controller under PV.

The desired temperature is the set point and is displayed on the bottom under SV.

The green lamp labeled OUT will light when the coating head is being heated.

AL1 and AL2 are alarms that are not used with this unit.

The AT lamp is lit during auto-tuning. **This has already been completed at the factory and should not be repeated.**

When the power switch is first turned on, the two displays of each controller will display preset parameters for the first four (4) seconds. This will include whether the display is set for Fahrenheit or Celsius and the maximum and minimum set point values. The display will then automatically change to display the process value and set point. This is the normal operating mode.

After turning the heater on and changing the set points, allow the unit to stabilize. The factory has tested the unit at 250˚F. It usually takes 45 minutes to 1 hour for the unit to fully stabilize.

Warning: Once the heater is turned on, the temperature will rise very quickly. The 45 minutes mentioned above is the time for full temperature stabilization. It is not the time needed for the coating head to come up to temperature.

NOTE: When you first turn on power, you may notice the smell of burning oil. This is normal as oil is used as a cooling agent when boring the holes in the coating bars.

NOTE: It is very important to let the machine run for 45 minutes after each adjustment to allow the temperature to stabilize.

Warning: Allow the coating bars, the back dam, and the heating rods to cool to room temperature before touching.

TOUCHING HOT COATING BARS, BACK DAM, OR HEATING RODS WILL CAUSE SEVERE INJURY!!!

SETTING TEMPERATURE

Follow the instructions below to set the temperature for the top coating bar, bottom coating bar, and reservoir. The temperature of the top coating bar, bottom coating bar, and reservoir are all controlled independently.

1. Turn the machine on.
2. Push the **SET** button.
3. The temperature setting under **SV** will start blinking.
4. Use the < arrow to select which number you would like to change.
5. Use the up and down buttons to select the correct number for the temperature.
6. Once the correct temperature is entered, press the **SET** button to set the coater to the programmed temperature.
7. When no entry has been made for a period of one (1) minute, the controller will return to normal operation with the last recorded set point.

HEATED COATING PROCEDURE

The following is the correct procedure for coating hot melt adhesive samples. Refer to the UC-200, Universal Coating Head, manual for a description of terms for the coating head.

1. Remove the 2 Teflon dams.
2. Remove the reservoir block by turning the 2 flip plates and sliding the reservoir towards the un-wind upright assembly.
3. Slide the aluminum rod through the roll of substrate and set the rod in the notches of the un-wind upright assembly.
4. Pull the end of the substrate down between the coating bars.
5. Pull enough substrate out so that it extends 4-5 inches beyond the end of the mounting base.
6. Replace the reservoir block and turn the 2 flip plates so that they are holding the reservoir in place.
7. Place the Teflon dams in the reservoir. Slide them to the desired location.
8. Use the 2 thumbscrews in the front along with the digital thickness gauges to set the gap between the top and bottom coating heads.
9. Insert the heating rods.
10. Turn power on. SEE TEMPERATURE CONTROLLER OPERATION FOR DETAILS.
11. Set the controllers to the desired temperatures and allow the unit to stabilize.

    NOTE: Three separate controllers allow temperature control of individual parts of the coating head. By adjusting the controllers separately, the coating process can be fine-tuned.

    NOTE: If overshoot becomes a problem, adjust the set point for 20 degrees below the desired process value. When the coater has stabilized at this temperature, increase the set point to the desired value and allow the unit to stabilize.

12. Add the pre-melted adhesive to the back dam.

    NOTE: Although using a pre-melted adhesive is the preferred approach, the adhesive can be melted in the coater. Temperature sensitive webs may be damaged when melting adhesive in the coater because the web may be exposed to heat for an excessive period of time.

13. Pull the substrate through the coating bars at a downward angle of about 15˚. Pulling the sample at a downward angle will eliminate the smearing of the adhesive on the freshly coated sample and provide an accurate coating thickness.

CAUTION: COATING BARS ARE HOT!!! PULL ENOUGH SUBSTRATE TO ALLOW YOU TO CUT THE SAMPLE 4-5 INCHES BEYOND THE COATING BARS.

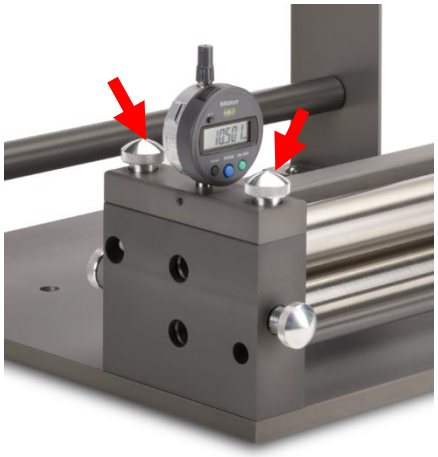
14. Pull the sample to desired length or until the adhesive runs out.
15. Cut the sample with a razor knife.

HEATED CLEANING PROCESS

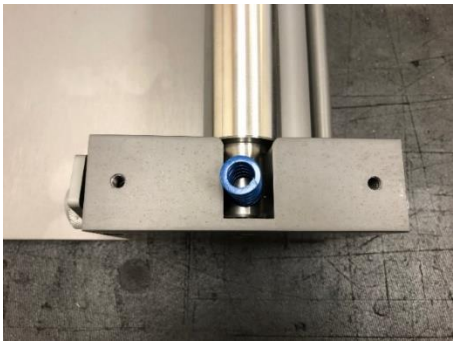
The coating head can be disassembled for cleaning.

NOTE: BE SURE THAT THE MACHINE IS TURNED OFF AND THE COATER IS AT ROOM TEMPERATURE.

1. Remove the plate on the right side of the machine that holds the heating elements in place.
2. Remove the heating elements from the top and bottom coating bars and the reservoir. **NOTE: THE HEATING ELEMENTS MAY BE HOT EVEN IF COATING BARS ARE AT ROOM TEMPERATURE.**
3. Remove the reservoir block and 2 Teflon dams.
4. Loosen the thumbscrews on the left top plate. You will have to loosen both thumbscrews at the same time to prevent them from binding up.
5. Loosen the thumbscrews on the right top plate. You will have to loosen both thumbscrews at the same time to prevent them from binding up.



6. Pull off both the left and right top plates. Remove the spring from each side.




7. The top coating bar can now be removed for cleaning.
8. The bottom bar can be cleaned in place.
9. The top and bottom coating bars can be cleaned with a soft cloth and solvent. Be sure to only use a soft cloth that will not cause scratches to the coating bars.
10. Once the cleaning is complete, re-insert the top coating bar.
11. Install spring on each side.
12. Install right and left top plates.

NOTE: If it is necessary to scrub the coating bars, use only a soft cloth. The bars are precision ground and any scratches to the surface will affect the accuracy of the coatings.

MAINTENANCE

The ChemInstruments Universal Coating Head is a very simple machine. It requires very little maintenance. However, the machine requires a thorough cleaning after every use. The coating bars are precision ground and must be kept clean to provide quality coatings. The cleaning process was discussed in the previous section.

TROUBLESHOOTING

The troubleshooting chart describes some problems that may occur over time. After determining the problem, follow one of the following maintenance procedures.

UNPLUG THE MACHINE BEFORE ATTEMPTING MAINTENANCE PROCEDURES!

ELECTRIC SHOCK MAY OCCUR IF THE MACHINE IS PLUGGED IN!

Troubleshooting Chart

Problem	Possible Cause	Procedure
Power switch not lit	Machine not plugged in.	Plug machine into correct power source.
	Fuse blown.	Replace with correct fuse.
Controller displays "LBA"	Thermocouple wires loose or disconnected.	Check connections inside control box. (See Below – A)
	Heating rod thermocouple is bad.	Replace heating rod. Call ChemInstruments.
Green OUT lamp lit, PV not increasing, but coating head temperature is increasing.	Controller is bad.	Replace controller. Call ChemInstruments.
Green OUT lamp lit, PV not increasing, coating head temperature not increasing.	Heating rod wires loose or disconnected.	Check connections inside control box. (See Below – B)
	Relay loose or bad.	Check relay and replace if necessary. (See Below – C)
	Controller is bad.	Replace controller. Call ChemInstruments.

THERMOCOUPLE CONNECTIONS

1. Each heating rod cable contains four wires. The thermocouple wires are the small red and white wire.
    a. The red wire should be connected to terminal 9.
    b. The white wire should be connected to terminal 8.
2. Replace the back panel making sure not to pinch any wires.
3. If "LBA" is displayed on the front of the heating controller, then there is a break in the thermocouple connection for that controller. If the above connections are not bad, then the internal thermocouple must be bad and the entire heating rod must be replaced.

NOTE: The thermocouple wires are solid wire, making it easy to break or crack if bent too severely. When checking these connections, be gentle with this wire.

HEATING ROD CONNECTIONS

1. Each heating rod cable contains four wires. Two larger wires are hot and neutral. The hot wires from each of the rods are connected to a red butt splice, which has a yellow wire running to terminal 6 of the relay sockets.
2. The remaining neutral wire is connected to a blue butt splice, which has a white wire running to terminal 7 of the relay sockets. This white wire is connected to all heating rods, all controllers, and all relay sockets through a series of blue butt splices. If one of these connections is loose, the rods will not heat up.
3. Make sure these connections are tight.
4. Replace the back panel making sure not to pinch any wires.

REPLACING THE RELAY

1. The relays are the clear plastic boxes. First check to make sure each relay is firmly seated by pushing down gently.
2. If the relay doesn't move, continue with replacement. If it does move, firmly seat the relay, reassemble the unit, and test.
3. To remove a relay, wiggle it in a circular motion while gently pulling it out of the socket.
4. Install a new relay by lining up the tab on the plastic post on the bottom of the relay with the mating part in the socket. Push it firmly into the socket.
5. Replace the back panel making sure not to pinch any wires.

REPLACEMENT PARTS

Part Number	Description
R-HLC-HEATING ELEM 120	Replacement Heating Element for Heat Control 120V
R-HLC-HEATING ELEM 240	Replacement Heating Element for Heat Control 240V
R-HL/HLC/HLCL FUSE HOLDER	Replacement Fuse Holder
R-HL/HLC/HLCL HEATING CONTROL	Replacement Heating Controller
R-HL/HLC/HLCL RELAY	Replacement Relay