



HOT MELT DRAWDOWN COATER

MODEL HLC-100, HLC-101

OPERATING INSTRUCTIONS

CHEMINSTRUMENTS

510 COMMERCIAL DRIVE

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PRODUCT DESCRIPTION

Congratulations on the purchase of your new ChemInstruments Hot Melt Coater. You now have a small, versatile coater that allows you to coat 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.

This unit has the following features:

- Two precision ground, stainless steel coating bars.
- Set gap quickly with two feeler gauge sets.
- 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.
- Unwind stand is capable of holding roll stock up to 12 inches (30 centimeter) diameter by 12 inches wide.
- Can coat continuous samples up to 6 inches wide.
- Coating range capable of producing 25 gsm to 1,500 gsm samples.

Upon receipt of a new ChemInstruments Hot Melt Coater, there are some steps that should be followed in setting up the system. Following these steps will help to extend the life of the unit and also help to achieve better, more consistent results.

SPECIFICATIONS

Electrical	120 VAC, 50/60 Hz, 15 amps or 240 VAC 50/60 Hz, 8 amps
Product Sample Width	3 inches (7 centimeters) to 12 inches (30 centimeters)
Reservoir Capacity	Up to 125 mL
Reservoir Temperature	Up to 400 degrees Fahrenheit (204 degrees Celsius)
Physical Dimensions Unwind Stand & Coating Head	Width: 16 inches (41 centimeters) Depth: 18 inches (46 centimeters) Height: 18 inches (46 centimeters) Weight: 42 pounds (19 kilograms)
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 Hot Melt Coater 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.

The HLC-100, HLC-101 consists of the following parts:

- An envelope with this manual.
- Control box with 3 heating rods coming from back panel.
- Coating head with 2 stainless steel coating bars.
- Unwind mounting base which includes 3 flathead and 2 button head screws.
- Unwind upright assembly.
- An aluminum rod for holding the roll of substrate.
- Two Teflon side dams.
- Two thickness gauges.
- One heat control Instruction Manual.

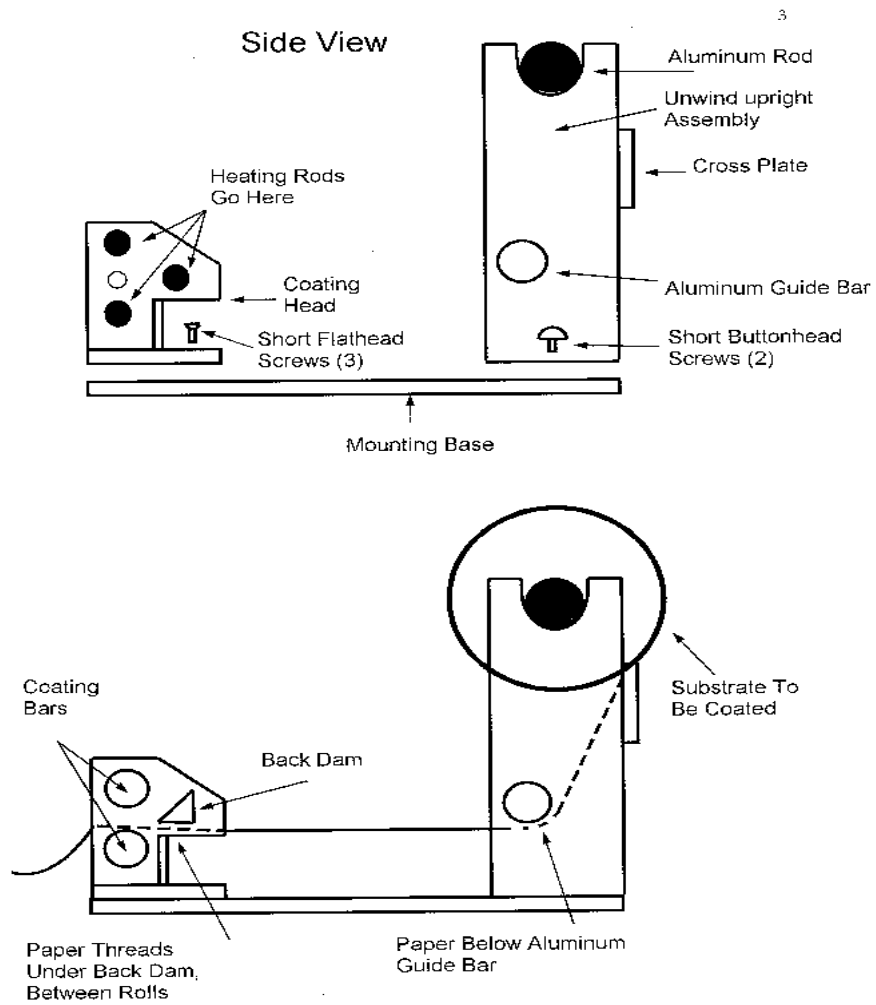


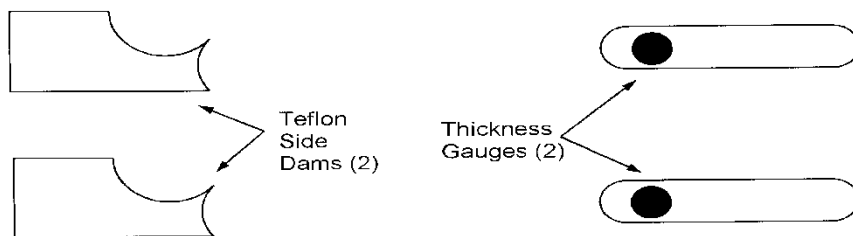
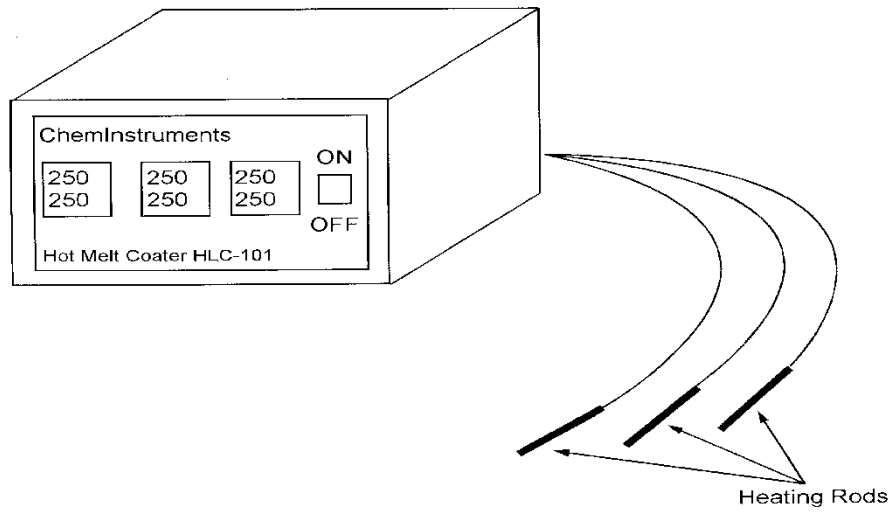
NOTE: The ChemInstruments Hot Melt Coater has been fully factory tested and is ready for operation. There is no need to program the temperature controllers. The instruction manual is included only as a reference for customers with special applications.

The coater should be set up in an area that has at least 24 inches of vertical space, access to the back of the unit, and the appropriate AC outlet nearby. Leave plenty of room in front of the coating head so the sample may be pulled at a downward angle.



Warning: The coating bars are precision ground stainless steel. They are manufactured to a very high tolerance to ensure quality coatings. Handle the coating bars with extreme caution, using only a soft cloth to clean or move. Do not set the bars down on a hard surface – use a soft cloth as a protective layer.





ASSEMBLY

The Hot Melt Coater has several different parts that need to be assembled before the coater can be used. Refer to pages 7 and 8 for illustrations.

1. Attach the unwind upright assembly to the mounting base with the short button head screws provided. The screws will screw into nuts, which are permanently mounted on the bottom of the mounting base. The cross plate on the unwind upright assembly should be toward the rear of the machine and the aluminum guide bar should be toward the coating head.
2. Place the coating head on the mounting base, lining up the holes in the base plate of the coating head with the holes in the mounting base. Attach the coating head to the base with the short flathead screws provided. The screws will screw into nuts, which are permanently mounted on the bottom of the mounting base.



Warning: Make sure to remove all strapping, protective wrapping, etc. from the coating bars before turning the machine on!!!

3. Slide the heating rods into the holes in the side plate of the coating head. One rod should go into each of the following places: top coating bar, bottom coating bar, and back dam. The rods are labeled and should be placed in the appropriate location. The individual heating controllers are labeled to match certain heating rods, so proper placement is important.

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

THEORY OF OPERATION

The ChemInstruments Hot Melt Coater allows thorough evaluation of formulations without the expense of full scale production. The HLC-100 has the ability to heat each coating bar and the reservoir separately, which offers a greater range of control and diversity for your applications. The reservoir is not designed to melt your coating, only to keep it at set temperature. The following is a step by step process to create a finished product using the HLC-100.

POWER UP

Turn power on with the master switch located on the front panel.



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 HLC-100 machine. Damage will occur if this unit is plugged into the incorrect power supply.

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 SP. 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 on the heater 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.

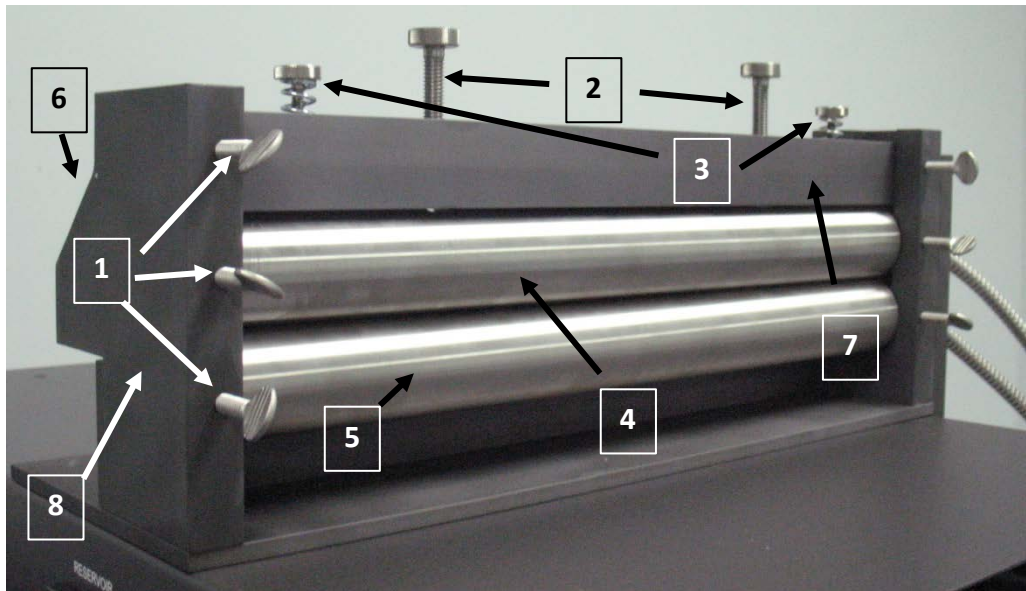
NOTE: It is very important to let the machine run for 45 minutes after each adjustment to allow the temperature to stabilize.



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!!!**

COATING HEAD



1. Thumbscrews
2. Gap Adjusting Screws
3. Tension Screws (These secure the top coating bar to the crossbar. They are set in the factory and do not require any adjustment.)
4. Top Coating Bar
5. Bottom Coating Bar
6. Reservoir
7. Crossbar
8. Upright

COATING OPERATION

The following is the correct procedure for coating hot melt adhesive samples:

1. Slide the aluminum rod through the roll of substrate and set the rod in the notches of the unwind upright assembly.
2. Pull the end of the substrate down between the cross plate and the aluminum guide bar.
3. Remove the dams, back dam, and top coating bar. *NOTE: Lay the top coating bar on a soft cloth to avoid scratching it. Scratches on the coating bar surface will affect the quality of the coating.*

4. Pull enough substrate out so that it extends 4-5 inches beyond the end of the mounting base.
5. Make sure the bottom coating bar is firmly seated and then tighten the thumbscrews holding the bar in place.
6. Lay the substrate over the bottom coating bar.
7. Replace the back dam.
8. Replace the top coating bar.
9. Plate the Teflon side dams in the reservoir with the flat surface on top of the back dam. The bottom surface of the dams should be at a 45 degree angle with the larger cutout facing up. Lift the top coating bar slightly and slide the Teflon dams underneath with the top bar resting on the larger cutout.
10. Using the thickness gauges, one at each side of the coating head, set the spacing between the two bars to the desired distance and tighten the thumbscrews holding the top coating bar in place.
11. Insert the heating rods.
12. Turn power on. SEE CONTROLLER OPERATION FOR DETAILS.
13. 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.

14. 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.

15. 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.

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

RESERVOIR

The reservoir is located on the back of the coating head. The Teflon dam inserts are placed in the reservoir as shown in the picture. The dam inserts can be positioned anywhere in the reservoir to create the specified width of the coating you would like to create.



CLEANING

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. Loosen the thumbscrews and remove the top and bottom coating bars and the reservoir.

4. 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.

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.



MAINTENANCE

The ChemInstruments Hot Melt Coater 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 repeatedly provide quality coatings.

CLEANING

After finishing the coating job, turn off the controller and allow the unit to cool. When the coating bars are cool, disassemble the coating head. **The heating rods may still be warm even though the coating bars are cool!!!** If possible, soak the bars, dam, and back dam in solvent overnight.

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.

The nature of some adhesives may make it necessary to clean the unit while it is still warm.



Warning: Use extreme caution if it is necessary to clean the unit while it is still warm.

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.

A. 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.

B. 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.

C. 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 BOTTOM ROLL	Replacement Bottom Roll for te HLC-101
R-HLC COATING HEAD	Replacement Coating Head for HLC/HLCL, does not incl rolls
R-HLC DAMS	Replacement Dams for the HLC/HLCL (1 set, 2 dams)
R-HLC DIAL	Replacement Dial Indicator for the HLC/HLCL (1pc)
R-HLC FEELER GAUGES	Replacement Feeler Gauges(1) for the HLC
R-HLC RESERVOIR	Replacement Reservoir for the HLC/HLCL
R-HLC TOP ROLL	Replacement Top Roll for the HLC-101
R-HLC-HEATING ELEM 120	Replacement Heating Element for HLC 120V
R-HLC-HEATING ELEM 240	Replacement Heating Element for HLC 240V
R-HL/HLC/HLCL FUSE HOLDER	Replacement Fuse Holder for the HL/HLC/HLCL
R-HL/HLC/HLCL HEATING CONTROL	Replacement Heating Controller for HL/HLC/HLCL
R-HL/HLC/HLCL RELAY	Replacement Relay for the HL/HLC and HLCL series
R-HLCL UNWIND CORE	Replacement 3" Core for LC, HLC, HLCL Unwinds, Includes Break