



## LMS-90A General Instructions

### Introduction

The LMS-90A is a temperature controlled 'Puck' system. The 'Puck' can be mounted on any of the Jr-27xx series probe station (since 2002) or used as a stand alone temperature controlled stage. The Puck has 4 ea. #4-40 mounting holes on a 3" bolt circle on the base and 4 ea. 10-32 mounting holes in a 2.75 inch square pattern on the top surface. Standard or custom chucks from J microTechnology or customer developed can be mounted on the Puck. Vacuum is available from the top to bottom through a vacuum bypass for use on the probe station or directly from the side as a stand alone temperature stage. The LMS-90A system is comprised of three units, the Thermal Puck (LMS-90A-P), the Temperature Controller (LMS-90A-TC), and the Water Cooler Assembly (LMS-90A-WC). Setup information is found on the pages following this introduction.

### Performance

The Thermal Puck top side temperature can be controlled from -10°C to +125°C. The actual chuck temperature range is dependant on the chuck thermal mass and heat/cold loading.

Typical expected performance is summarized below.

	Controller Reading/Time	Surface Temp Reading
Puck	25°C to -10°C / 5 min.	-8°C
	-10°C to 125°C / 4 min.	123°C
	125°C to 25°C / 3 min.	25°C
Puck with 3.75" Chuck	25°C to -5°C / 9 min.	-1°C
	-5°C to 125°C / 6 min.	118°C
	125°C to 25°C / 5 min.	25°C
Puck with 4.5" Chuck	25°C to -5°C / 10 min.	0°C
	-5°C to 125°C / 6 min.	116°C
	125°C to 25°C / 5 min.	25°C

Other larger chucks may be used with reduced temperature range performance.

**Thermal Puck(LMS-90A-P)**

The Thermal Puck is manufactured by J microTechnology. It is a liquid cooled Thermal Electric assembly with a integrated AD590 temperature sensor. Cables and cooling hoses are permanently attached to the Puck.

**Temperature Controller(LMS-90A-TC)**

The Temperature Controller is a comprehensive thermal control subsystem manufactured by Melcor Industries. This unit can be configured to operate off either 110V or 200/220 Volts with a switch and cord set change. Be sure to check that switch is set appropriately for region of operation. The controller is configured by J microTechnology to operate with a Analog Devices AD590 precision temperature sensor. Controller is set to operate with the Thermal Puck as configured out of the box upon arrival. Other advanced features of the Temperature Controller can be accessed by referring to the Melcor manual.

**Water Cooler Assembly(LMS-90A-WC)**

The Water Cooler Assembly is a self contained unit with an integrated pump, reservoir, fan assembly, heat exchanger and controller from Koolance. The unit has been modified to allow the temperature monitoring of the cooling fluid. Power is supplied by a worldwide universal 12 volt desk top power supply. Be sure to connect the appropriate cord set for the region of operation. Cooling Fluid is distilled water and antifreeze. Unit will be shipped with residual cooling fluid from check out and burn-in at J microTechnology but will require a fluid fill/charge before use. A cooling fluid charge is 1/2 bottle of antifreeze(supplied) with the balance of fluid being distilled water.

**Moisture**

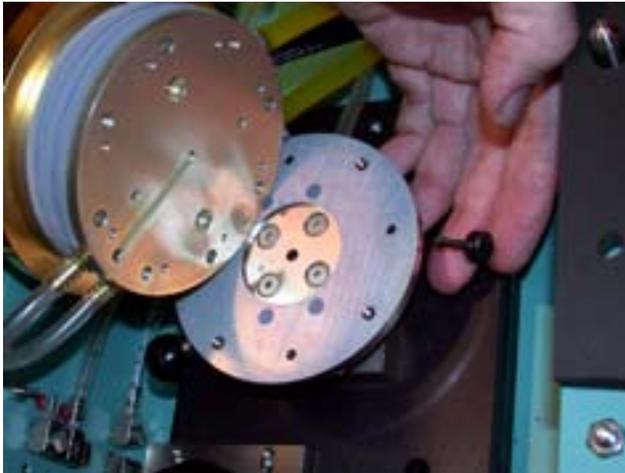
With all temperature controlled chucks, moisture or frost will accumulate on the surface when the temperature of the surface is below the dew-point of the air surrounding. Moisture free operation requires dry 'air' and an enclosure to contain the dry 'air' environment.

**Important Limits**

The temperature limits have also been set to restrict the temperature control region to **-15°C low temperature and +130°C high temperature**. Operation above 130°C can shorten the life of the Thermal Puck(LMS-90A-P). **Attempted operation above 150° will result in failure of the Thermal Puck.**



## Setup Instructions



### 1) Mounting Thermal Puck to Stage (LMS-90A-P)

The Thermal puck mounts to a Jr-2727 or Jr-2745 with 4 ea. 4-40 Thumb screws. These screws are inserted through #4 clearance holes in the x-y- $\emptyset$  translation stage. The holes are 'blind', so it is recommended that one thumb screw be inserted through a clearance hole on the right side of the stage and the Puck aligned to a single 4-40 threaded hole. Once one thumb screw is started, the puck can be positioned on the stage in alignment with the stage top (the Puck and the stage top are the same diameter). All the other clearance holes and the mounting holes will now be aligned for 'blind' insertion of the thumb screws. Tighten the first thumb screw loosely. Insert and loosely tighten the other thumbscrews by rotating the stage left or right approximately 90 degrees to position the holes on either the left or right for easier insertion. After all thumb screws have been inserted, tighten all the thumb screws finger tight.

Route the hoses and electrical control cable out the back of the probe station. Stage Brake/Lock may need to be adjusted to inhibit the chuck from rotating due to the cable and hose forces.

### 1) Setup of Temperature Controller(LMS-90A-TC)

The Temperature Controller may be conveniently located to the left or right of the probe station or on a shelf above the probe station.

Confirm that the input Voltage switch is in the appropriate position and the power cord set is for the region of operation.

Plug in the power cord.

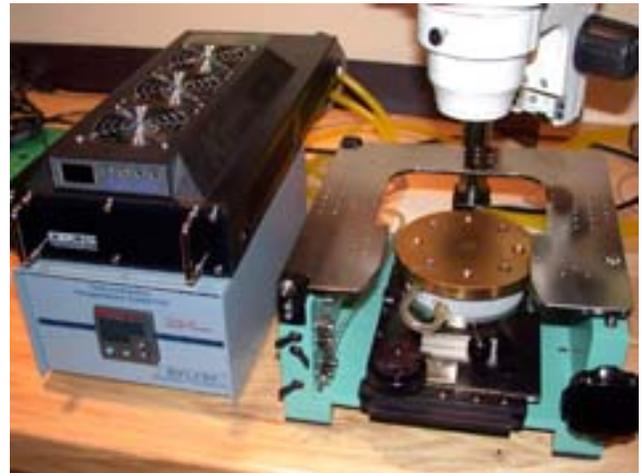
Plug in the Temperature sensor connector, it is white with twisted pair wires.

Turn on the power switch on the back of the Temperature Controller.

Confirm that the display reads the approximate Chuck Temperature, room ambient.

Turn off the Temperature Controller.

Plug in the Thermal Electric power connector, an orange connector with black and red wires.



Temperature Controller is operational at this point. Do not turn on and operate for more than 1-2 minutes without the Water Cooler connected.



### 3) Setup of Water Cooler(LMS-90A-WC)

The Water Cooler may be located with the LMS-90A-TC or at an independant location. It does have double connection mushroom fasteners on the bottom to 'mate' to the Temperature Controller. Convenient locations may be to the left or right of the probe station, on a shelf above the probe station or under the test bench.

Before doing the next steps it is advised to have paper or cloth towels handy for wipe up of spilled or dripped cooling fluid. The hoses have 'shut-off' connections, but a drip or two is inevitable during connection or disconnection. Note there will be some residual fluid in the hoses and controller, left over from system integration, check out and burn-in.

Plug in the liquid cables to the back of the Water Cooler. There is no polarity, either hose can be connected to either receptacle.

Fill reservoir by inverting the Water cooler and unscrewing the reservoir fill/drain plug on the underside of the Water Cooler. A coin works well since this plug is never to be overly tightened. Recommended cooling fluid is 1/2 bottle of antifreeze (supplied ) with the balance of fluid being distilled water. A small blue funnel is supplied to facilitate filling. Fill to bottom of fill plug hole.

Plug in the universal 12 volt power supply into the connector on back of the Water Cooler (Power supply is suitable for worldwide use with the appropriate regional cord set or plug adapter without any switch changes). Water will circulate through the Water Cooler system and Thermal Puck. This will move air out of the system to the reservoir.

Add additional distilled water to minimize air in the system. It is not critical that all 'air' is removed from system though. In normal operation some air will be noticeable in the viewing window of the reservoir, but no bubbles will be flowing through the yellow tubes.

Replace the fill drain/plug finger tight. Check for leaks and wipe up any fluid drips, dispose of towels with antifreeze/water in appropriate containers.

Turn Water Cooler to it's upright position and position either on top of the Temperature Controller, secured with the mushroom fasteners or another convenient location.

Confirm that the display reads approximate room ambient.

Water cooler is operational at this point. **It is recommended that the Water Cooler be plugged in and operational before the Temperature Controller is activated.**



Reservoir fill/drain plub on bottom of Water Cooler



Power and water hose connection on back of Water Cooler

# Operation Instructions



## 1) Ready to Use

After the initial setup the LMS-90A is functional and ready to use by turning on the power and adjusting the desired temperature on the front panel of the Temperature Controller using the up/down buttons.

The front panel of the Temperature Controller has 4 buttons and 2 displays, The far left button controls 'home page' operation.

The middle bottom button sets the Temperature Controller and the display into normal operation.

The two right buttons set the desired temperature of are also used for advance feature programming. This discussion will only refer to 'normal' operation.

Advanced features can be reviewed in the Melcor Temperature Controller Operating Manual.

## Temperature Set

Set the desired chuck temperature by pushing the up or down button until the temperature show on the lower green display. Temperature Controller will begin to change the chuck temperature immediately!

## Auto-tune

'At temperature' stability will be improved if the auto-tune function is activated. To activate auto-tune, after setting desired puck temperature, push the far left button 4 times or until 'auto' is displayed in the lower green display and 'off' is displayed in the upper red display . Push the right top 'up button' once to display 'on' in the red display. Push the center 'infinity' button to set display to normal. Upper red display will flash between actual temperature and 'tune' until temperature is within 90% of setting.

At this time the Temperature Controller will 'wiggle' the temperature to determine the thermal load properties and set the internal control functions for stable 'at temperature' control. This will take a few tens of seconds. The tune display will stop flashing and the Temperature Controller will change the chuck temperature with minimum overshoot to the desired temperature. A complete description of this function and modification, if required, are contained in the Melcor Temperature Controller Operational Manual.



Warning. Temperature Controller default parameter settings are different from the J microTechnology default parameter settings. It is not advised that the Temperature Controller be 'reset' to factory default. A list of the specific J microTechnology setting modifications is listed in appendix A, if that is ever required

# Appendix A

## 1) Controller Settings

These settings on the controller may need to be set if the controller is ever reset to 'Factory Default' The LMS-90A uses an AD590 temperature sensor which requires different settings than the factory default. In addition the minimum and maximum temperature points are dependant on the LMS-90A-P Temperature Puck.

### Sensor dependant Settings - AD590

Use the Front Panel Programming instruction found in the Melcor Instruction Manual on page 8.3 for setup of these parameters.

### High/Low Alarm Settings (-15°C and +130°C)

To set the High Low Alarm Settings got to the Alarm Menu on the Operations Page of the Front Panel Programming. This is done by: Push and hold the two buttons on the right for 3 secs. ALARM will display in red and OPER will display in green.

Push the far left button once, A3LO will be displayed in green.

Set the A3Lo value to -15 by using the far right buttons, the top one to set a higher temperature the bottom one to set a lower temperature value.

Push the far left button again to display A3hi.

Set the A3hi value to +130 by using the far right buttons, the top one to set a higher temperature the bottom one to set a lower temperature value.

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