



# Operating Manual LA-50 to LA-200

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## Safety Notices

Probe systems are modular in design and are built to customer's specifications. Labels on a system pertain to that specific system and are based on the final configuration.

Labels provide operational and safety information and should be followed all times.

**NOTE:** A note refers to special information for the user's attention. It provides additional information to be aware of.



Safety Symbol	General Description of Symbol
 CAUTION	<p><b>CAUTION:</b> Alerts operator of a hazardous condition, either immediately or the potential for one. Procedure could cause damage or destruction of the equipment if not performed correctly. Do not proceed until the indicated conditions are fully understood and met.</p>
	<p><b>HEAVY OBJECT:</b> Object may be too heavy for one person. Beware of injury to back when lifting.</p>

## List of Acronyms

<b>Acronym</b>	<b>Definition</b>
DUT	Device Under Test
in.	inch
LED	Light Emitting Diode
Mm	millimeter
PS4L	Probe System for Life

# 1 System Setup

## 1.1 Unpacking the Systems

	<p><b>CAUTION:</b> When electing a SemiProbe Installation, the System is to remain crated. A SemiProbe engineer will remove the system from the crate prior to installation.</p>
	<p><b>HEAVY OBJECT:</b> Prober weighs approximately 50 lbs. and can cause personal injury to back when lifting. Use assistant when moving or lifting prober.</p>

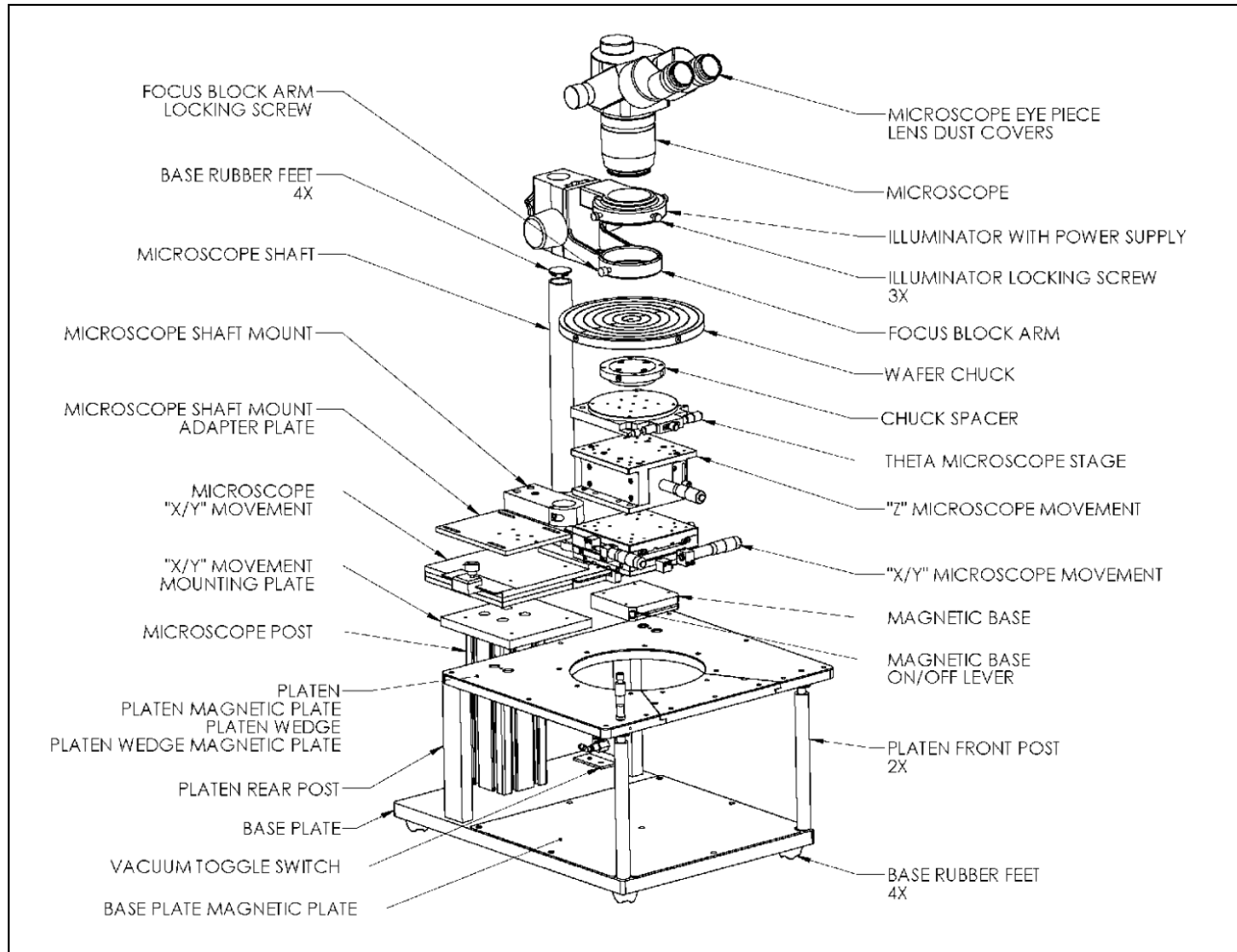
The purpose of this manual is to provide general unpacking and installation guidelines. The Probe System for Life (PS4L) is designed, built, and packed for easy setup and installation.

When delivered, inspect the crate for shipping damage. If damage has occurred, contact SemiProbe immediately. If SemiProbe installation has been declined and no damage has been found, uncrate, and remove all components.

The Lab Assistant systems are shipped in one cardboard or wooden crate. The sub-assemblies will be packaged in small boxes within the larger shipping container. The Stage will be packaged in a separate box wrapped in bubble wrap.

Remove the packing list from the crate and make sure to check the list against the components before throwing anything away, as small components can be overlooked.

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## 1.2 Set-up Procedures

The probe systems basic components include:

- The wafer stage,
- Wafer chuck,
- Platen and platen post,
- Platen lift,
- Prober base,
- Optics, and
- Manipulators.

The tools required for setup and installation are:

- 1 set of metric Allen wrenches,
- A power strip



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Additional accessories may include:

- a CCTV camera,
- monitor and
- extra manipulators.

**Base System with Wafer Stage and Chuck**

1. Carefully place the stage on the base plate so that the magnet On/Off lever is pointing forward for easy access.
2. Move the chuck to the center of the plate and slide the magnet base on/off lever to the on position. The stage will be locked into place. Refer to Figure 1-1.
3. The chuck is electrically floating. Use the screw provided on the side of the chuck to connect your instrumentation on to ground. This can be a permanent or temporary connection.

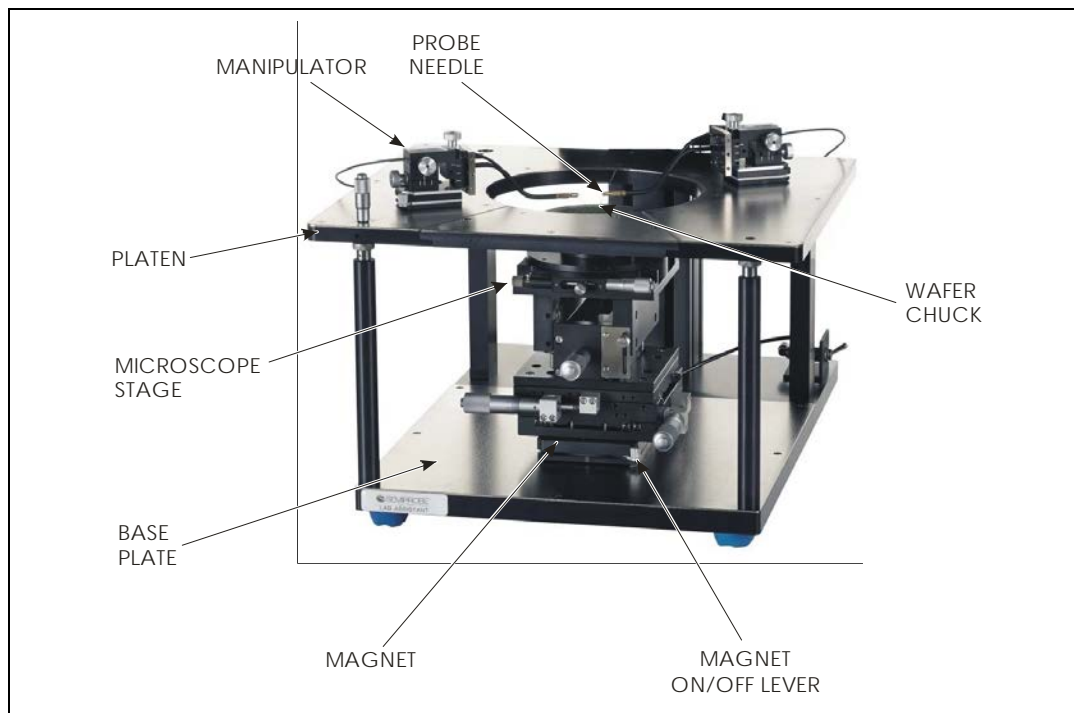


Figure 1-1. Stage Assembly

4. Attach the vacuum hose from the supply line to the fitting behind the vacuum toggle switch. Refer to Figure 1-2.

**NOTE:** A vacuum hose has been supplied for your convenience. The other fitting on the vacuum switch has a length of vacuum tubing already on it.

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5. Plug the tubing into the fitting on the side of your wafer chuck. Press it firmly into place. If necessary, to remove this line, pull the colored ring away from the tubing (towards the chuck) and gently pull the tubing from the fitting.

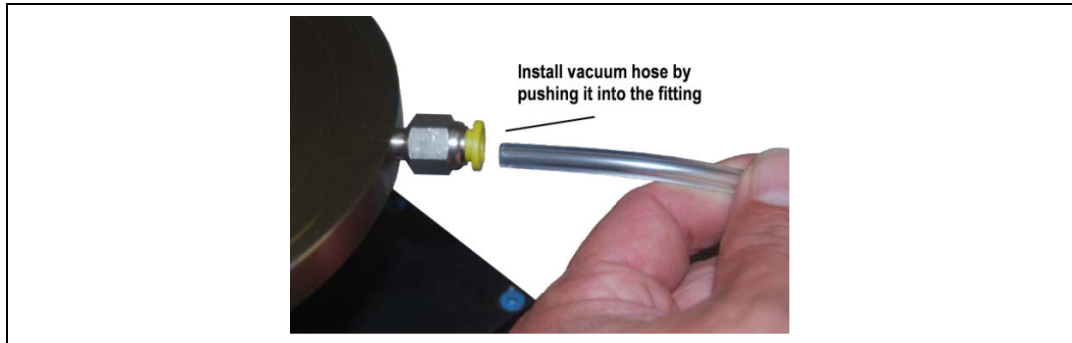


Figure 1-2. Vacuum Hose Installation

## Platen

The platen comes with a removable front wedge. The wedge is screwed down on either side. It is also held in position with small locator posts. For many applications this does not need to be fastened down and can be easily removed and returned to position by lifting off the posts. More sensitive measurements may require the screws to be fastened down. Removal allows easier access to wafers during change out. It also provides additional access to the stage controls.

## Probe Tips

The manipulator arms are equipped with an easy to use clamping collet. The collet has 3 mounting positions: straight, 45 degree, and 90 degree.

1. Position each manipulator so that you have access to the end of the probe arm.
2. Using the collet, clamp each probe tip into the arm of your manipulator.

**NOTE:** Make sure your manipulator is secured to the platen so that it is not dropped.

**NOTE:** Make sure the distance the needle is exposed on each manipulator is similar.

3. Snip the back of the probe tip off to reduce the “antenna affect” and to provide more room between the probes and objectives. The probe needle may also be bent down.

**NOTE:** If using triaxial probe arms, handle the arm wearing gloves to avoid fingerprint grease from contaminating the probe. This small amount of grease can adversely affect probe performance. If they are contaminated, they can be cleaned with alcohol

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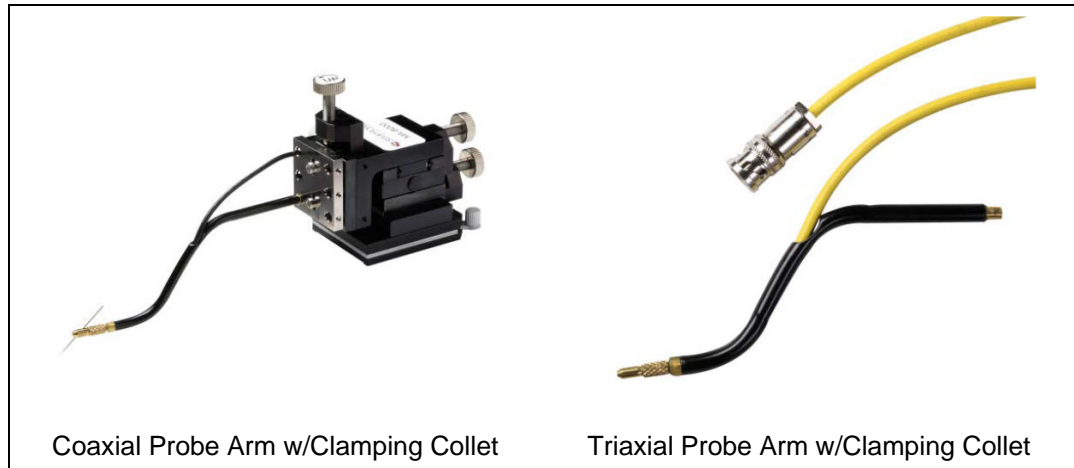


Figure 1-3. Probe Arms

### Optical System

The optical system includes:

- The microscope body,
- Two eyepieces,
- An LED illuminator,
- The illuminator power supply and
- The microscope support arm.

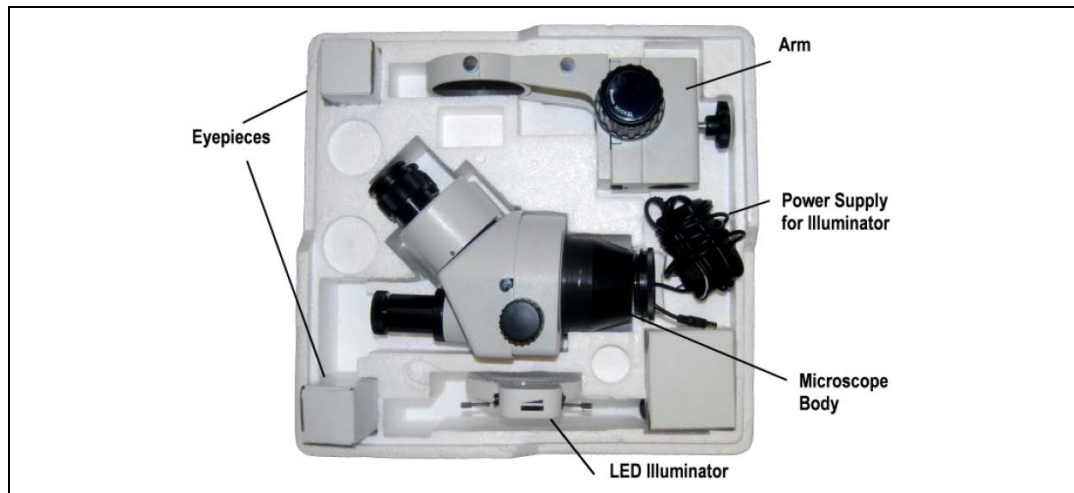


Figure 1-4. Microscope

1. With the focus block arm approximately 1-in. (25 mm) above the base of the microscope shaft mount, slip the microscope body down into the focus block arm. Once seated, fasten it with the focus block arm locking screw. Do not over tighten this screw. Refer to Figure 1-5.

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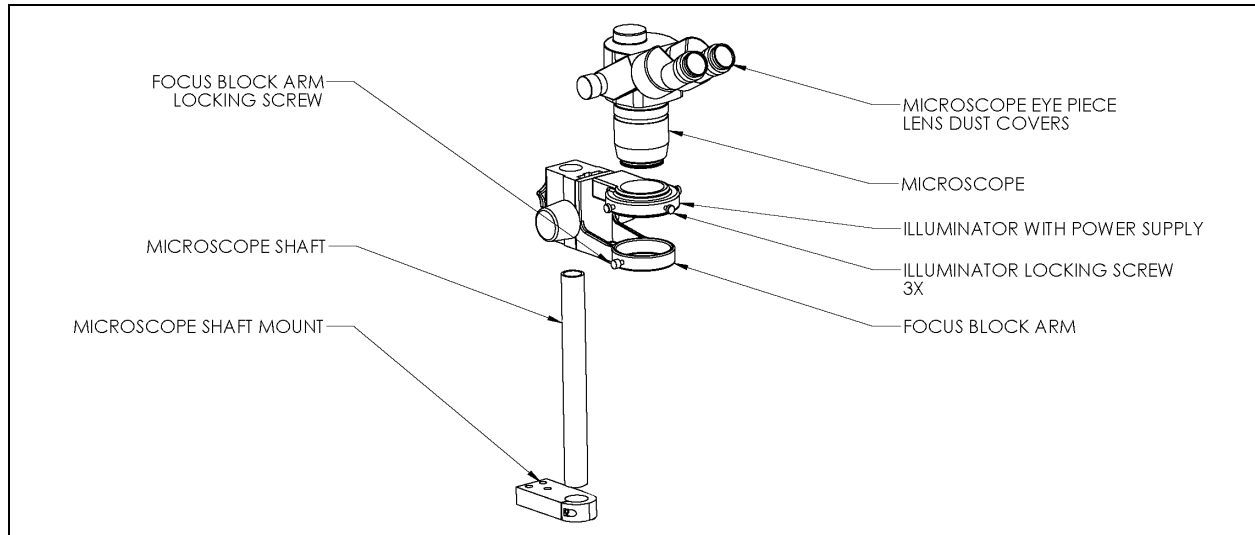


Figure 1-5.

2. Slip the illuminator over the objective ring of the microscope. Tighten the three illuminator locking screws to hold it in place.
3. Plug the power supply into the illuminator and the other end into the wall.
4. Remove the microscope lens dust covers and slide the eyepieces into the sockets. Be careful not to touch the optical surfaces with your fingers.

### Manipulators

The system comes with two MA-8005 manipulators, magnetic bases, and coaxial probe arms with test cable attached. The manipulators are the direct connection between the circuit and the test instrument. The faceplate on the manipulator has six holes to mount the probe arm.

**CAUTION:** MANIPULATORS ARE FRAGILE AND CAN EASILY BE DAMAGED. USE CAUTION WHEN HANDLING.

1. Place the manipulators on the platen. Refer to Figure 1-1.
2. Move the magnet on/off lever to the on position to hold the manipulators in place.
3. Insert the arm into the desired hole and fasten with the set screw on the side of the plate.

## 2 Getting Started

### 2.1 Adjusting the Stage

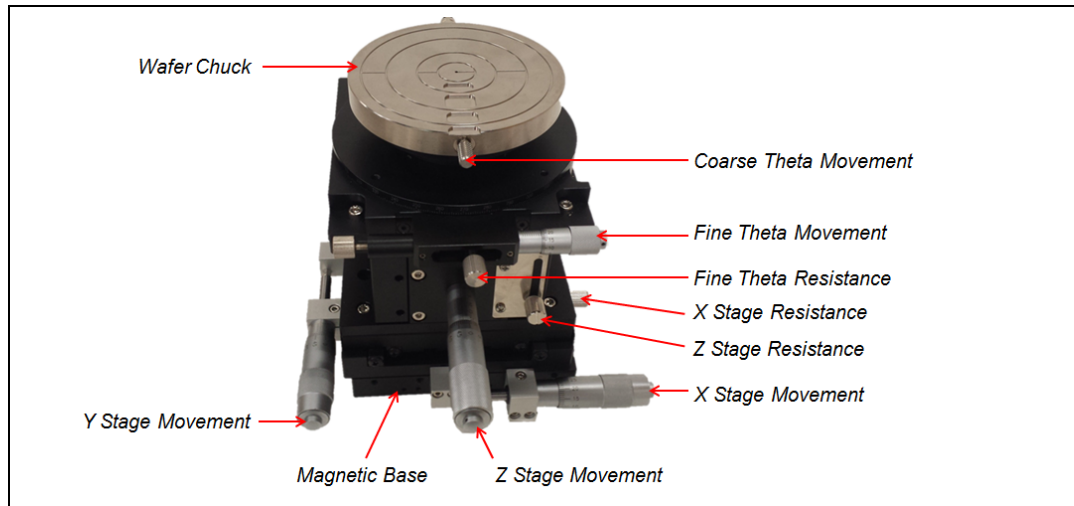


Figure 2-1. Stage

#### **Coarse and Fine Stage Adjustments.**

1. For course XY adjustments, release the magnetic base. The stage will move to the region of interest on the wafer near the probes set up or in the center of the platen opening. The magnet is then engaged. The fine coaxial movement is used to make the final position.
2. Loosen the fine Theta resistance knob to allow theta to be moved easily via the coarse Theta movement knob. The Fine Theta movement micrometer is used for fine adjustment of the Theta axis.
3. Set up the device so that the streets on your wafer are parallel to the axis of fine stage motion. This way correction can be accomplished in a single motion.
4. A gross Z correction can be made turning the Z stage movement micrometer until you are near the desired contact position. This correction has 1-in. (25 mm) of travel.

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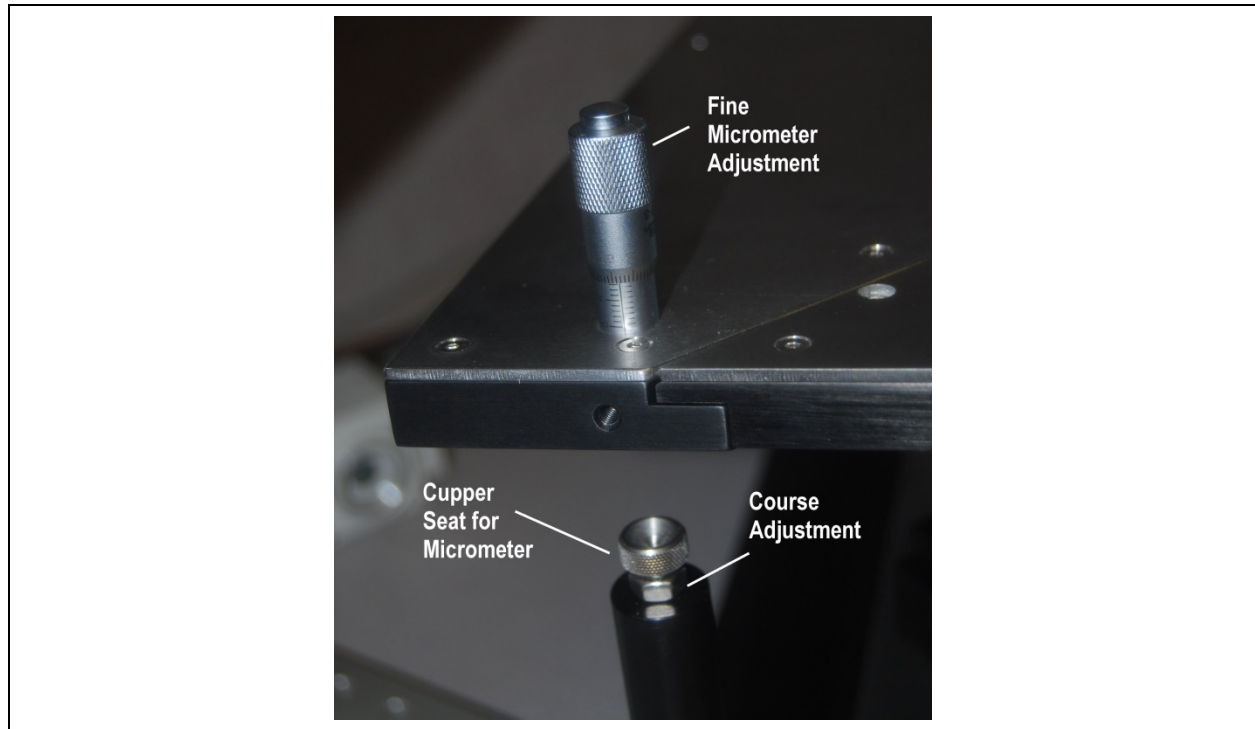


Figure 2-2. Probe Adjustments

### 2.1.1 Stage Setup

1. Put the microscope stage in the center of the base plate. Refer to Figure 2-3.
2. Move the adjustment screw on the right-hand front side of the platen to the farthest down position. Refer to Figure 2-2.
3. Move the wafer chuck to the center position on the fine control.
4. Set up a manipulator with a probe needle close to contact on the center of the wafer chuck.
5. Using the fine control, move the stage backwards and forwards so that the probe needle moves over the wafer chuck. Refer to Figure 2-2.  
**NOTE:** Be careful not to dig the needle into the chuck surface.
6. As the needle comes closer or farther away from the chuck adjust the platen height using the micrometer adjustment.
7. When the platen is in level position, screw the adjustment knob up until it just touches the platen.
8. Lift the platen up using the micrometer adjustment to lift all probes off the (Device under test), see Figure 2-2.

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9. Lower the platen to return it to level position. All probes will go back into contact.

**NOTE:** For additional adjustment, use the course adjustment knob. Refer to Figure 2-2.

10. Once positioned, lock into place using the locking screw.

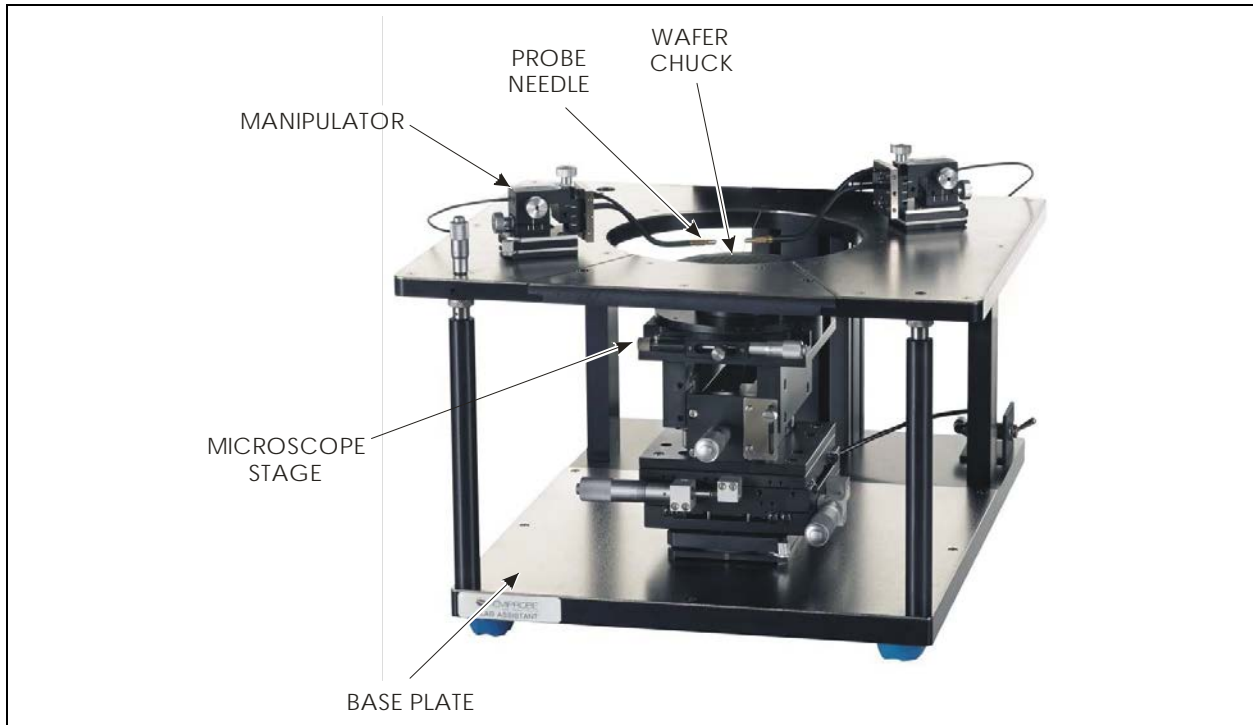


Figure 2-3. Stage Setup

## 2.2 Adjusting the Microscope

For adjustment purposes, use a wafer similar in thickness to those currently in use. Changes in wafer thickness will result in repeated adjustments.

Microscopes are mounted on a coaxial X-Y movement, allowing movement to different areas on the device once probes are down or for locating a particular device when near the desired location.

The microscope is controllable using one hand leaving the other free to adjust instruments or manipulators. With a single hand you have contact with both X and Y control. The X knob is on the top in the center and the outer ring controls the Y axis, refer to Figure 2-5

**NOTE:** The microscope can be mounted with a higher profile by using the configuration in Figure 2-4.

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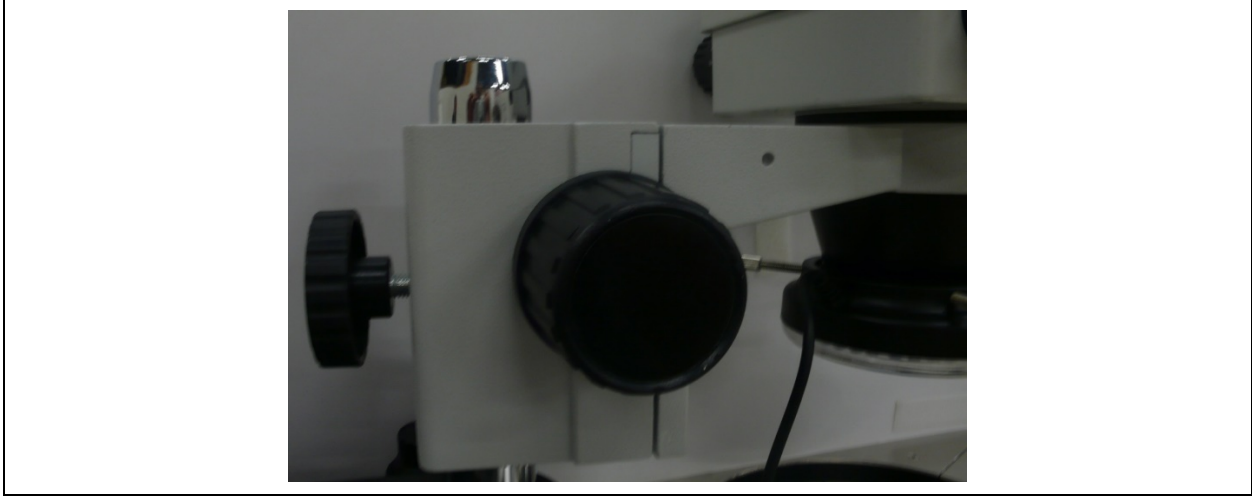


Figure 2-4. Microscope Higher Profile Configuration

1. Using a sample wafer, put the microscope approximately 1-in. (25mm) from the bottom of the bottom support.
2. Move the microscope to the lowest magnification. To adjust the focus, move the microscope up or down.
3. Move the microscope to its highest magnification and adjust the focus.
4. If necessary, adjust the height until you have full range of magnification without adjusting the back microscope position.

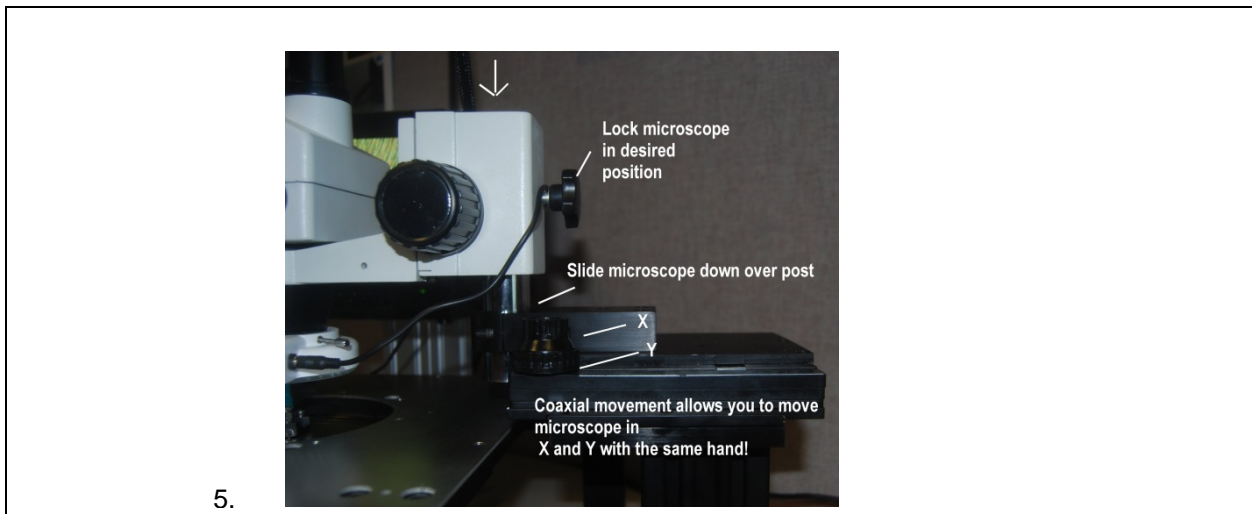


Figure 2-5. Microscope Adjustments



## 2.3 Adjusting the Vacuum Chuck

1. The vacuum chuck controls are located on the right side of the probe. A single switch turns the vacuum on and off.

**NOTE:** Vacuum is not provided as part of the system but is usually available in most labs. If vacuum is not available, SemiProbe does sell small quiet vacuum pumps. Ask your SemiProbe representative for details.

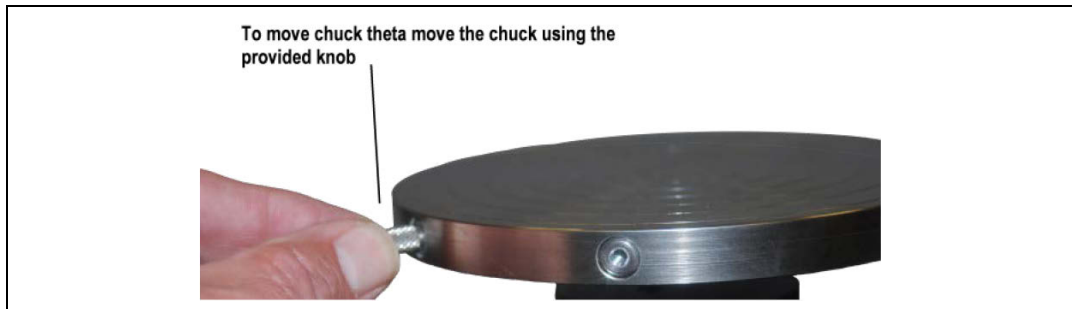


Figure 2-6. Vacuum Chuck Controls



## 3 System Requirements

### 3.1 Power

When ordering your system, your local power requirements should have been identified. The manual station itself does not require power; however accessories such as microscope illuminators, CCTV systems, thermal chucks, etc. do require power. Your accessories will come with the appropriate voltage set. You may be supplied a plug adapter for your power strip for all accessories.

### 3.2 Maintenance

This station requires little or no operator maintenance. Keeping the station clean is strongly recommended. Broken wafer fragments and dust need to be removed from the lead to prevent undue wear.

It is recommended that a SemiProbe service technician do an annual service on the system. Service plans area also available.

#### ***Service Contact Information***

For system service or any questions contact:

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[mostafa@semiprobe.com](mailto:mostafa@semiprobe.com)



## NOTES