



MPI TS200-SE

200 mm Manual Probe System User Manual



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4. Never attempt any procedure on the MPI TS200-SE probe system that is not specially described in this manual. Unauthorized operation can cause faults or accidents. MPI Corporation is not liable for any problems resulting from unauthorized operation of the equipment.

In this manual, safety instructions are preceded by the symbol . Always read and follow the instructions before performing the required procedures. Informational notes are preceded by the symbol . It indicates important information about the product.

PREFACE

Thank you for purchasing the TS200-SE probe system. This user manual is intended for users who are using the probe system for the first time. It provides all necessary information about the overview, unpacking and installation procedures, operation and maintenance of the system.

SAFETY NOTICE

The information in this manual will help users to have a safer and more efficient operation of the probe system. Any nonconformity from the proposed operation or any modification of use which the probe system is not intended may result in a hazardous and not efficient operation scenario or situation. MPI Corporation renounces any claim of responsibilities for any consequences resulting from any alteration and nonconformity from intended use of the system.

Please consult our MPI technical support team or our service representative if you are unsure of using the equipment.

SAFETY LABELS

The following labels may appear on your probe station depending on the application configuration of your probe system. Read all safety instructions in this document and on the probe system. Report any problems to a MPI Corporation service representative.



CAUTION! : Electronic Shock! Danger of Operation!

Do not touch during operation. Danger of electric shock or burn. Switch or turn off electrical power before accessing part



CAUTION! : Hot Surface! Danger of burning!

Do not touch during operation. Allow it to cool to ambient temperature (19°C to 24°C) before coming to contact with surface.



CAUTION! : Cold surface! Danger of freezing!

Do not touch during operation. Allow it to warm up to ambient temperature (19°C to 24°C) before coming to contact with surface.



CAUTION! : Moving Parts! Danger of injury!

Do not touch during operation.



CAUTION! : Laser Radiation! Avoid direct eye exposure!

Do not stare into beam. Wear eye protection at all times.

For More Information

More information may be available from these sources:

- **World Wide Web:** mpi-corporation.com

The MPI Corporation website contains current information about the company and locations of sales offices, new and existing products, contacts for sales, service and technical support information. You can also send e-mail to MPI Corporation using the web site.*

- **Other:** If you purchased your MPI product from our distributors or representative, you can contact them for service and support.

**When sending email for technical support, please provide information on both the hardware and software, with a detailed description of the problem.*

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Overview

The MPI TS200-ShieldEnvironment™ (TS200-SE) is designed to ensure advanced EMI/RFI/light-tight shielding, ultra-low noise, low leakage measurement capabilities in a temperature range from -60 to +300°C.



TS200-SE Manual Probe System Front View with the Microscope

1. Microscope	2. Microscope movement
3. ShieldCap™	4. ShieldEnvironment™
5. Platen lift	6. Thermal Chuck Integration
7. Kelvin interface panel	8. Probe Platen
9. Chuck XYT stage	10. Vacuum Controls for Scope, Chuck and Aux Chuck

Probe System Architecture

Microscope and Movement

MPI TS200-SE microscope movement is mounted on top of the rigid microscope bridge. The bridge supports both 5050/8080 ZUM movement and 5050ZUM-VM pneumatic Z movements with XY controlled knobs. Several microscope types are available and each has its own separate adapter.

Probe Platen

The platen is incorporated with a platen lift function which consists of 3 preset positions: Lift (3mm from contact), Separation (300µm from contact) and Contact (0 µm from contact). The probe platen can support up to 4 RF or 8 DC MicroPositioners

Wafer Chuck

MPI TS200-SE probe system can be equipped with different wafer chuck configurations to include RF chuck, mmW Chuck, auxiliary chucks and thermal chuck systems.

Chuck XYT Stage

The chuck stage consists of X, Y and Theta movement of the wafer chuck. The wafer chuck uses air bearing puck control for fast movement. The maximum stage travel in X is 225 mm and in Y is 260 mm. The theta stage has a fine micrometer adjustment of $\pm 5.0^\circ$ in theta.

Base Platform

The base platform of the probe station is secured on four shock absorbing rubber feet. The base plate is located in the center of the platform along with the microscope mounting bridge at the back of the platform. Together, these elements provide a stable mounting surface for the wafer stage, probe platen and microscope.

MPI MicroPositioner

MPI offers a wide variety of backlash-free MicroPositioners to address every operational and measurement condition. These vary from small footprint to micrometer driven high resolution positioners for RF and mmW applications.

Unified Z-direction, ergonomic operation, and strong magnetic bases enable fine probe placement for high contact quality producing unsurpassed measurement results. The MPI MicroPositioners are designed with universal interface compatible to all probe arms for ease of application specific adaptations. Design varieties allow operators to choose

MicroPositioners which fit their operational familiarity thus providing immediately proficiency.

MPI unique MP80-DX with easy and precise definition down to 1µm - is the ideal choice for accurate and cost-effective multiline TRL – the only RF calibration method in the mmW and sub-THZ range.

The MPI self-developed MicroPositioners are designed without compromise. The full carbon-steel structure enables stable contact over long periods of time and superior positioning accuracy.

Probe Arms/ MicroPositioners	Coax	Coax 10kV	Triax	Triax 3kV	Kelvin	RF	HC	Dedicated mmW
MP25	●	-	○	○	-	-	-	⊙
MP40	●	●	●	●	●	●	●	⊙
MP50 MP50-HR	●	●	●	●	●	-	-	⊙
MP60 MP60-HR	○	○	○	○	-	●	●	⊙
MP60-MR	○	○	○	○	-	●	●	⊙
MP80 MP80-DX	-	-	-	-	-	○	-	●

* ● = recommended ○ = available ⊙ = DC biasing



MP25

XYZ | 10 mm
Feature Resolution | < 4 µm



MP40

XYZ | 13 mm
Feature Resolution | < 2 µm



MP50

XYZ | 13 mm
Feature Resolution | < 1 µm



MP60 / MP60HR

XYZ | 13 mm
Feature Resolution | < 1 µm



MP60-MR

XYZ | 13 mm
Feature Resolution | < 1 µm



MP80

XYZ | 25 mm
Feature Resolution | < 2 µm

Non Electrical Utilities

MPI TS200-SE probe system requires compressed air and vacuum supply in order to operate the probe system. Please connect the compressed air and vacuum supply to the system. If the probe system comes with accessories that require compressed air, nitrogen or vacuum, connect them as necessary.

One grounding point can be found at the rear base platform of the TS200-SE manual probe system.

Electrical Utilities

MPI probe system may require power supply for the system accessories. For accessories which require high power consumption such as a thermal chuck system and controller should be plugged to the main power supply from the facilities supply of your location.

Open Connections

MPI TS200-SE probe system can be equipped with a wide range of accessories and options; each with its own electrical interconnects. The supported plugs and connectors are designed to prevent incorrect connections. Be cautious when connecting to other components.

Accessories

MPI TS200-SE can be configured with an extensive selection of accessories.

- Vibration Isolation Tables
- Test System Table with Integrated computer rack and keyboard tray
- Vacuum Pump
- Air Compressor
- Digital Camera and LCD/LED display screen
- Instrument Shelf
- Single or Dual Display Screen Stand
- Refer to MPI sales and distributor for more complete list of accessories compatible with MPI TS200-SE probe system.

Installation

Prior to the shipment of TS200-SE probe system, please refer to the facilities preparation sheet for the space and facilities requirement for the probe system. Contact a MPI service representative for more information.

Probe System Unpacking

Before unpacking TS200-SE probe system, inspect the wooden box(es) for evidence of damage or mishandling during shipping. Review the packing list and special instructions attached in the shipment.

Unpacking TS200-SE



1. Use an adjustable wrench or socket wrench (8 mm) to remove the screws securing the crate; the size of the crate depends on the accessories you purchase. Use a cardboard cutter to remove the wrap and open the cardboard box.



CAUTION

Be careful when unpacking the probe system and accessories! Handle all tools with care to reduce risk of injuries!



2. Unpack the individually wrapped parts and sub-assemblies. Handle the microscope and other fragile parts with care.



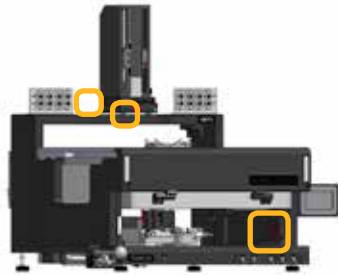
CAUTION

The probe platen is built and calibrated in factory prior to shipment to achieve fine micron level contact repeatability.

Do not lift the probe system using the probe platen.

Probe System - Transport Locks Removal

MPI TS200-SE probe system moveable stages are secured by transport locks. All transport locks are in **RED** color with secure screws. Remove all transport locks with Allen Wrenches.



Front View of TS200-SE with the Transport Locks.



Rear View of TS200-SE with Transport Locks



NOTE

Save the transport locks for any possible future relocation.

Microscope - Transport Locks Removal



50 x 50/80 x 80 ZUM or 5050 ZUM-VM Movements

Remove the **RED** transport lock and lock screws.

Microscope Installation

MPI TS200-SE probe system can be configured with four microscopes and three movements.

Microscopes:

- MPI SuperZoom SZ10-10x Single tube microscope with USB LED Light Source
- MPI MegaZoom MZ12-15x Single tube microscope with USB LED Light Source
- MPI EyeZoom EZ10-10X Binocular Microscope with USB LED Light Source
- MPI IMAG Video Microscope / Manual Probe System

Movements:

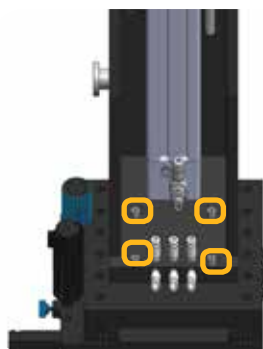
- 50 x 50/80 x 80 ZUM Movements
- 50 x 50 ZUM-VM Movements

Step 1: Mount the microscope onto the Microscope movement.

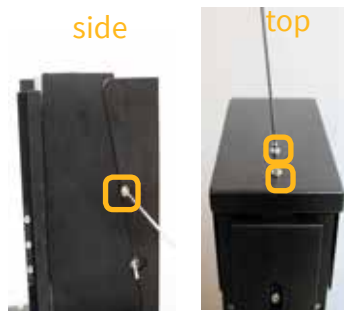
On 50 x 50/80 x 80 ZUM/5050ZUM-VM Movement

iMAG-M can be mounted on 5050/8080ZUM movement on TS200-SE. EZ10, SZ10 and MZ12 can be mounted on 5050ZUM-VM.

The installation procedures of 50 x 50/80 x 80 ZUM/5050ZUM-VM Movement are similar. Below is the illustration of installing 5050/8080ZUM Movements.

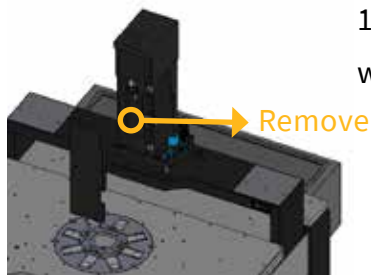


1. Secure four screws provided on the pneumatic Z lift with the 50 X 50 mm Microscope Movement by Allen Wrench.

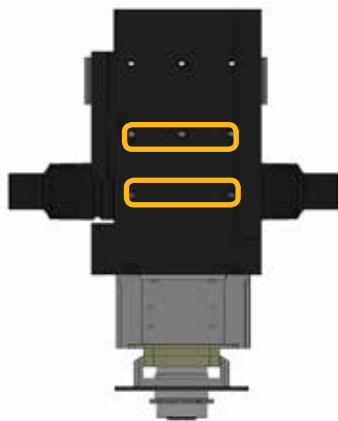


2. Fix the pneumatic Z lift of the Microscope Movement and the cover on left and right side with one screw each by Allen Wrench and two screws to secure its top side with by Allen Wrench.

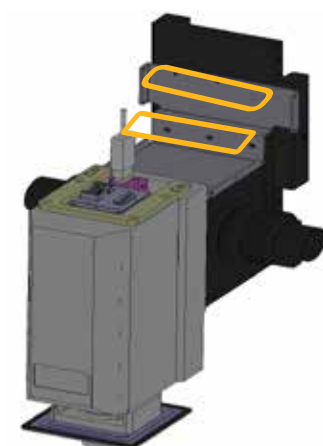
Option A: Mount iMAG-M and USB Cables on 5050/8080ZUM Movement.



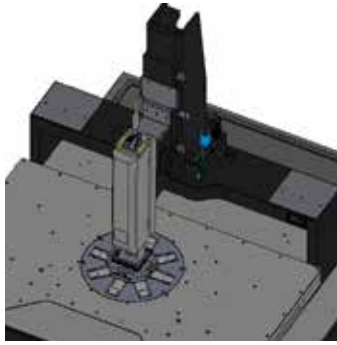
1. Remove the connecting bracket of 5050ZUM or 8080ZUM with an Allen Wrench.



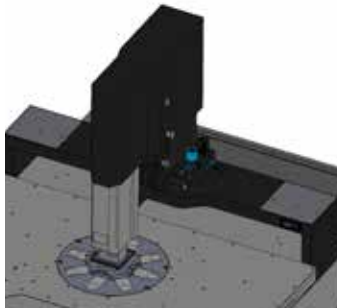
2. Connect the bracket of 5050ZUM/8080ZUM from step 1 as orange marks with an Allen Wrench and screws.



3. Connect the bracket as the orange mark and the bracket of 5050ZUM/8080ZUM from step 2 with an Allen Wrench and screws.



4. Mount i-MAG M onto 5050ZUM/8080ZUM , connect USB3.0 cable and its extension cord.



5. Mount the top and rear cover and fix with an Allen Wrench and screws to finish the assembly.

Option B: Mount EZ10, SZ10 and MZ12 on 5050ZUM-VM Movements on TS200-SE.



SZ10

1. Hold the microscope and fix four mounting screws with an Allen Wrench to secure the microscope on 5050ZUM-VM Movement.



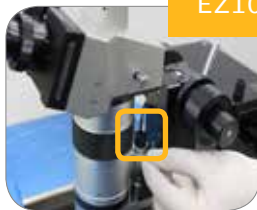
Step 2: .Installation of light source to microscope

LED light source with remote intensity adjuster and USB power supply.



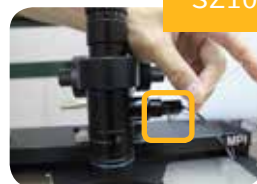
MZ12

Securing of LED light source to the MZ12 light source input with thumb screw.



EZ10

Install the LED Light source and fix it by fastening the thumb screw.



SZ10

Securing of LED light source to the SZ10 Light Source Input with an Allen Wrench.

Connect the LED light source to the remote intensity adjuster and then to the USB power supply.

Connect the USB power supply to your facility power.

Step 3: Install CCD camera 2MP to the microscope



MZ12

Turn the CCD Camera 2MP clockwise to lock.



MZ12

Make sure the CCD Camera facing the front and fix two rotation points securely by a slotted screwdriver



SZ10

Fix three rotation points securely with an Allen wrench.

Step 4: Install Moticam 1080 digital microscope camera to the microscope C-mount.



SZ10/MZ12/EZ10

Turn the C-Mount adapter provided in the Moticam 1080 package clockwise onto Moticam 1080 digital microscope camera.



MZ12

Turn the Moticam 1080 clockwise when mounting onto the microscope and lock the rotation points by slotted screwdriver.



Connect the HDMI, power cable and the USB dongle of the wireless mouse. Press the power button of Moticam 1080.

**NOTE**

If you wish to capture the graphic of probing from the Moticom 1080 digital microscope camera, take the USB cable from the box of Moticom 1080 and then connect it to Moticom 1080 and the computer.

Step 5. Install HDMI CAMERA MPI 1080 to the microscope.

Mount HDMI CAMERA MPI 1080 to the microscope.



Fix the Camera.



Connect SD Card, HDMI, USB Dongle and power cables.

1. Turn the HDMI Camera MPI 1080 clockwise onto the microscope.

2. Fix the HDMI Camera MPI 1080 firmly onto the microscope with three points and an Allen Wrench.

3. Connect the SD card, HDMI, power cable and the USB dongle of the wireless mouse.

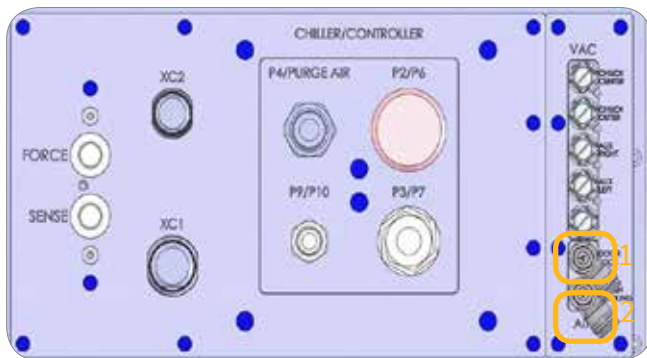
System Facility Hookup

There are two built-in fittings of TS200-SE to be connected, behind the probe system, are the Vacuum and Air speed controller fittings. Hook up all of the facility fittings to complete the installation of the probe system.



Facility Interface Panel (Optional)

Follow the figure below to connect cables to the facility interface panel on the rear side of the probe system. For more information, please refer to User Manual of Thermal Control System.



Probe System	Thermal Control System
1 Door Lock	Prober Lock
2 Platen Cooling	Aux Air

Installation Checklist

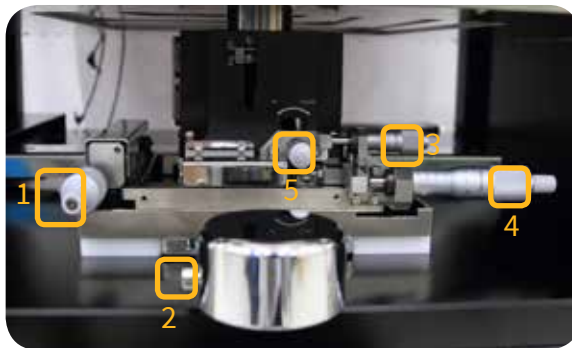
	GENERAL
	All transport locks have been removed
	All components and accessories have been installed
	All electrical interconnects are made and secured
	Non-electrical utilities are connected, including vacuum and air
	All components requiring AC power are plugged into outlets with the required voltage and VA or wattage
	Check the functionality of all components
	Check, and adjust if necessary, the planarization of the chuck stage and microscope movement
	Ensure that all safety covers, panels and enclosures are installed or secure
	Ensure that operator(s) are fully trained in the proper operation and maintenance of the system
	MICROSCOPE MOVEMENT
	Make sure that the transport locks of the microscope XY movement are loosened
	Ensure free, smooth movement throughout the full travel range
	Observe fine movement under the highest magnification
	Ensure smooth operation of microscope lift
	PROBE PLATEN
	Verify that all transport lock screws have been removed
	Ensure smooth and precise movement of 0.3 /3 mm Contact/Separation / Load stroke
	CHUCK XYT STAGE
	Verify that transport locks have been removed
	Ensure smooth, free movement over the complete surface and effective braking in X and Y
	Observe movement and braking in X and Y under the highest magnification. Make certain the image is clear. If necessary, adjust the leveling screw under the stage.

Operation

The operation of the MPI TS200-SE probe system is divided into five different sections, to include chuck stage, microscope movement, platen adjustment and control, system vacuum control, and MicroPositioner Setup and Control.

Chuck Stage

Chuck stage control has X, Y, Chuck Theta control and Chuck Z fine movement by micrometer and puck control to quickly move the wafer chuck.



1. Y stage controller
2. Puck control
3. Chuck theta fine adjustment
4. X Stage Controller
5. Chuck Z Fine Movement

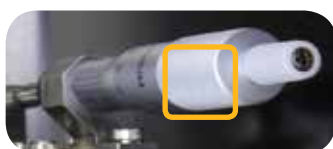
Chuck X/Y Stage Control

Turn the X stage control knob counterclockwise to move the wafer chuck to the left; turn the X stage control knob clockwise to move the wafer chuck to the right.

Turn the Y stage control knob counterclockwise to move the wafer chuck to the front; turn the Y stage control knob clockwise to move the wafer chuck to the rear.



Chuck Y Stage Micrometer



Chuck X Stage Micrometer

Chuck Theta Fine Adjustment

The theta control, located on the right side of the stage, can correct rotation of the wafer. It is generally not required when probing a single device or package, may be useful when probing multiple dies. Standard theta travel can be replaced by fine travel movement of $\pm 5^\circ$.



Chuck theta fine adjustment

Chuck Z Fine Movement

The Chuck Z Fine Movement, located behind the Puck Control, allows users to make Chuck Z fine Movement up to 5 mm. Turn the micrometer clockwise to lower the chuck height down to 0 mm, turn it counterclockwise to raise the chuck height up to 5 mm.



Chuck Z Fine Movement

Puck Control

The puck control provides fast and large movement of XY stage of the chuck. Press the control knob to quickly move the chuck; release the control knob to lock the movement of the chuck.



Control Knob

Microscope Movement

MPI TS200-SE probe system can be configured with four microscopes and three movements.

Microscopes:

- MPI SuperZoom SZ10-10x Single tube microscope with USB LED Light Source
- MPI MegaZoom MZ12-15x Single tube microscope with USB LED Light Source
- MPI EyeZoom EZ10-10X Binocular Microscope with USB LED Light Source.
- MPI iMAG-M Microscope

Movements:

- 50 x 50/80 x 80 ZUM Movements
- 50 x 50 ZUM-VM Movements



1

SZ10



2

MZ12



3

EZ10



4

iMAG-M

Height Adjustment

SZ10,EZ10 and MZ12Microscope

Turn the coarse adjustment knob and move the main body of the microscope to either an upper or lower position to obtain the image coarsely. Turn the fine adjustment knob and move the main body of the microscope to either an upper or lower position to obtain the sharpest image.

Turn the lock knob counterclockwise to unlock the Coarse Adjustment. Turn the lock knob clockwise to lock the Coarse Adjustment.



Lock Course Height Adjustment



Coarse Height Adjustment



Fine Height Adjustment

XYZ Movement Adjustment

Operate XY Stage movement of 5050/8080 ZUM/5050ZUM-VM Movements

Turn the Y movement controlled knob counterclockwise to move the microscope forward and turn it clockwise to move it backward. Turn the X movement controlled knob counterclockwise to move the microscope to the right and turn it clockwise to move it to the left. Turn the thumb screw clockwise to lock the movement and turn it counterclockwise to unlock the movement.

Operate Z stage of 050/8080 ZUM Microscope Movement

The Z movement includes pneumatic Z up movement and manual Z up movement.

Pneumatic Z Up Movement: Turn on the switch to automatically raise the Z movement of the microscope to 80 mm or plus. Turn the switch off to lower the Z movement automatically.

Manual Z Up Movement allows additional up to 50 mm lift of the microscope; two stages are provided to adjust: 25 mm and 50 mm.

How to operate:

1. Loosen two thumb screws.
2. Pull the manual Z up movement control knob.
3. Hold the bottom of microscope's focus block to move up /down till you hear a "click" sound.
4. Press the manual Z up movement control knob and then turn to lock the two thumb screws to fix the Z position of the microscope.



CAUTION

If you wish to use the focus function of the microscope, move the pneumatic Z movement at the lowest height and move the manual Z movement at 25 mm first.



1. X Movement Control Knob
2. Y Movement Control
3. X Movement lock screw
4. Y Movement lock Screw
5. Thumb Screw
6. Manual Z Up Movement control knob

Operate 50 x 50 mm ZUM-VM Microscope Movement

The XY Movement of 5050ZUM-VM is the same as 5050/8080 ZUM mm Linear Movements. Please refer to the operation of 5050/8080 ZUM Movements.

Pneumatic Z Up Movement: Turn on the switch of SCOPE to automatically raise the Z movement of the microscope to 140 mm or plus. Turn the switch off to lower the Z movement automatically.



1. X Movement Control
2. Y Movement Control
3. X Movement lock screw
4. Y Movement lock screw

Magnification Adjustment

On SZ10 and MZ12: Turn the magnification adjustment tube counterclockwise to increase magnification and turn it clockwise to lower magnification.



1

2

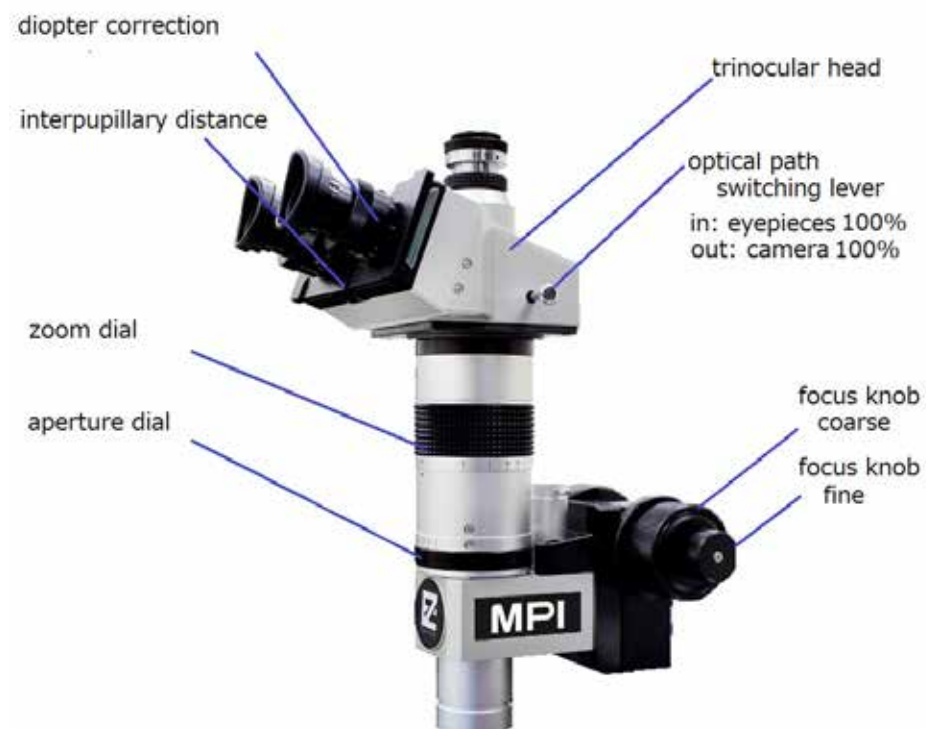
- 1 - SZ10 Magnification Adjustment
- 2 - MZ12 Magnification Adjustment

Focus Adjustment

Turn the coarse or fine height adjustment knob until the DUT is clear in the LCD monitor.

Operation of EZ10

1. Turn on the LED lighting and adjust to the maximum light intensity.
2. While watching the eyepieces the eyepieces of trinocular head and slide the interpupillary by hands so that the right and left visual fields should be one. Interpupillary distance has individual differences.
3. Read the interpupillary distance in scale at center. Adjust the diopter correction beside the both eyepieces so that it becomes same values.
4. Determine the zoom ratio. Here, turn it to low magnification 0.85 x (high magnification 8.5 x).
5. Set the aperture dial to 1 (5 for high magnification 8.5 x).
6. While watching the eyepieces, turn the focus knob (coarse adjustment of large diameter, fine adjustment of small diameter) to focus on the DUT.
7. Turn again the aperture dial to match the contrast that is easy to see.
8. Repeat 6 to 7 again if changing the zoom ratio. For example, if you change the zoom dial to high magnification 8.5 x, the aperture dial should be around 5 is recommended.
9. Pull the optical path switching lever to the right. The optical path switches to the camera side, and you can see the image on the monitor.



Platen Adjustment and Control

The platen controls (except the platen cable clamps) are valid only for the manual drive platen. The platen controls include the precise contact/separation/safety load and lock by the platen lift and Platen Lift with Probe Hover Control™.

Unique Platen Lift with Probe Hover Control™

Contact /Separation/Safety Load of the Platen Lift

The repeatable (1 μm) platen lift design has three discrete positions for contact, separation (300 μm), and loading (3 mm). The lift includes a safety lock rotation utility which prevents accidental platform descent. These features offer unparalleled functionality and are standard offerings for the MPI TS200-SE manual probe system. Prevention of unexpected probe or wafer damage is critical to system design and provides intuitive control, accurate contact positioning, safe set-ups, and easy step and repeat functionality.

In safety load position, turn the platen lift control stick clockwise to lock it securely. Turn it counterclockwise to unlock the platen lift.

Platen Lift with Probe Hover Control™

Additional Probe Hover Control™ comes with hover heights (50, 100 or 150 μm) for easy and convenient probe to pad alignment.



Follow the steps below to operate Probe Hover Control™

1. Load the button to the designated location such as 50/100/150 μm to work with appropriate magnification of the microscope.
2. Lift the level to the topmost.
3. Load the platen lift to complete the discrete separation.
4. If you wish to make the probe tips and DUT contact during probing, load the separation level to the lowermost.

LED Indicator of Contact

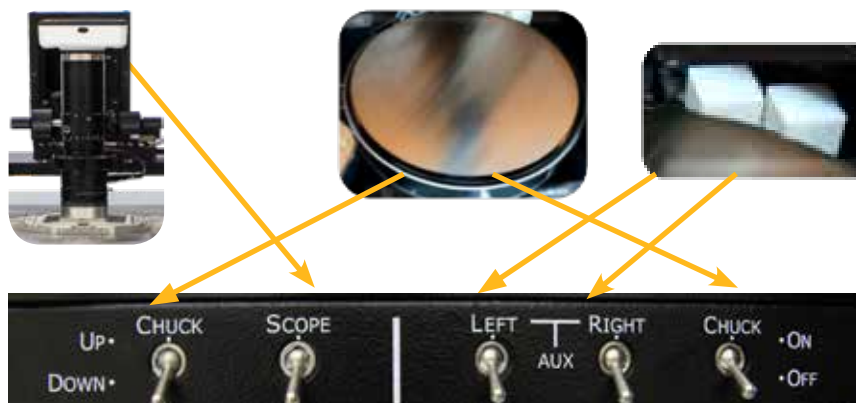
When the platen lift is in CONTACT position, the CONTACT LED light on the front panel will be ON and the Puck Control will be locked. It means Chuck XY stage will be locked as well

to protect the probe tips from damage.



System Vacuum Control

Five vacuum ON/OFF switches located on the front-bottom panel of TS200-SE from right to left are Chuck, Aux Right and Left, Scope and CHUCK UP/DOWN. Switch on chuck vacuum control when operating the wafer chuck and vice versa. Switch on left and right Auxiliary Chucks to controls vacuum for the calibration substrates on the left and right auxiliary chucks. Scope vacuum control has to be switched on when using the microscope on Z Movement. Turn the switch to Chuck UP to quickly raise the height of the wafer chuck up to 20 mm; Turn the switch to CHUCK DOWN to lower the height of wafer chuck down to 0 mm.



Chuck Vacuum Switch Control (Optional)

If the chuck is equipped with the wafer vacuum switch control, user can slide to adjust the different vacuum zone of the chuck. It allows 4 vacuum zones (4 mm center, 100 mm, 150 mm and 200 mm) for small substrate of 5 mm by 5 mm, 100 mm wafer, 150 mm wafer and 200 mm wafer.

The adjustable switch located on the left hand side of the chuck controls four stages vacuum controls of the wafer, marked as C,4,6 and 8.



Wafer vacuum switch

MicroPositioner Setup and Control



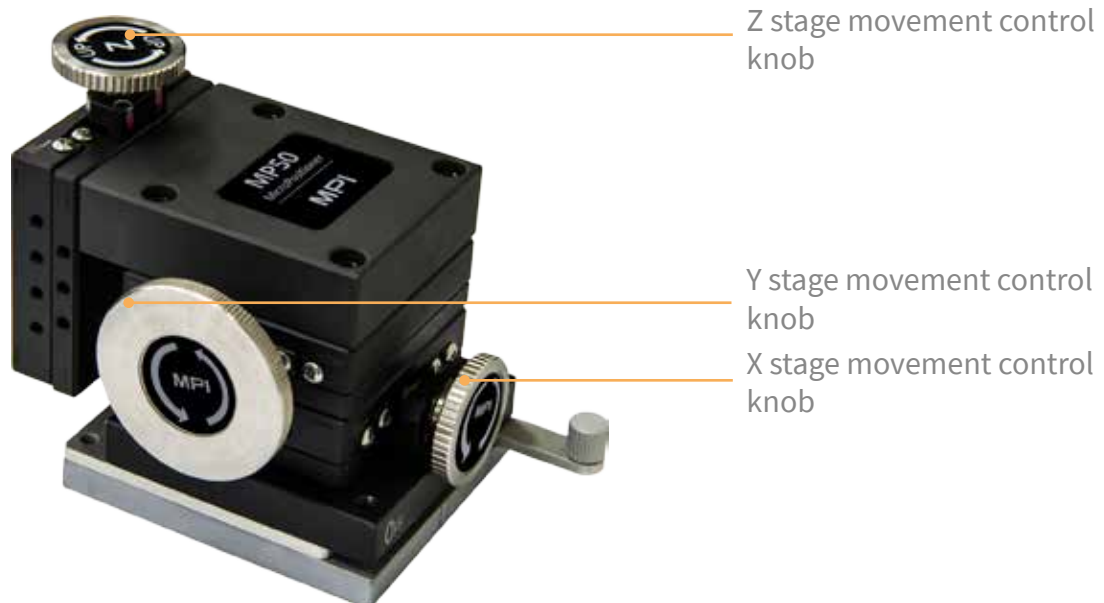
All MPI MicroPositioners have magnetic base to create the extreme stable force when mounting the platen. Switch “ON” to mount it firmly onto the platen and switch “OFF” to remove it from the platen.

XYZ Stage Movement Adjustment

Turn the X stage movement control knob clockwise to move the X stage to the left; turn it counterclockwise to move the X stage to the right.

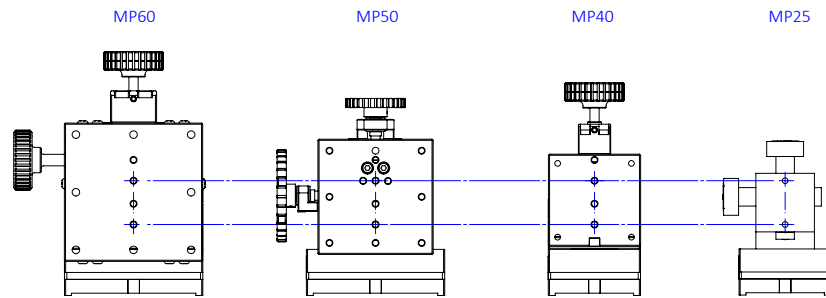
Turn the Y stage movement control knob clockwise to move the Y stage to the rear; turn it counterclockwise to move the Y stage to the front.

Turn the Z stage movement control knob clockwise to lower Z stage; turn it counterclockwise to raise Z stage.



Mount DC Arm and Probe Tip on SE Probe System

1. Bolt the universal DC adapter onto the MicroPositioner with an Allen Wrench and two screws provided. Two blue lines on the figure below are the screw locations of each MicroPositioner.



2. Load the DC arm connecting the cable. Fix the magnetic ring with an Allen Wrench.

→ Fix the magnetic ring with an Allen Wrench



3. Turn the thumb screw of the universal DC adapter clockwise to fix the probe arm.

→ Turn to fix the DC adapter



4. Load the probe needle at the end of the probe arm and tighten the probe arm to fix the probe needle. Probe needle can be loaded at flexible angle, 45° and 60°.

turn to lock

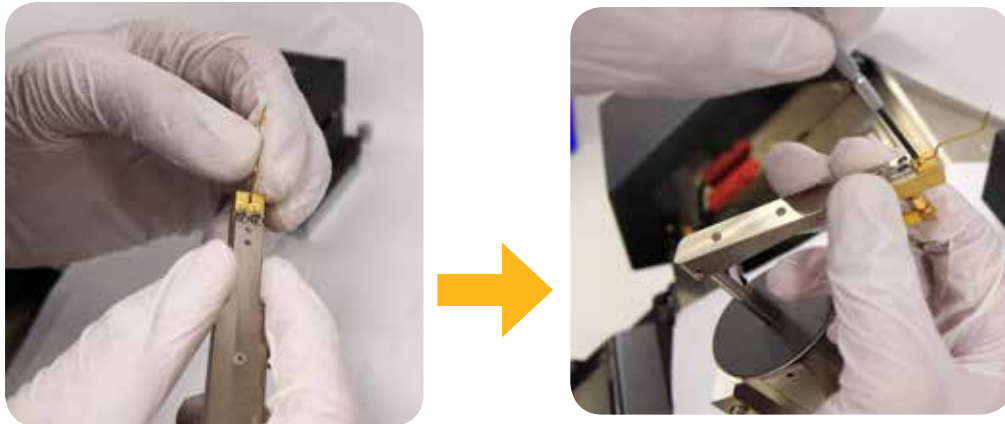


CAUTION

Do not touch the insulation part with bare hands as it may cause contamination resulting in poor performance of the probe arm.

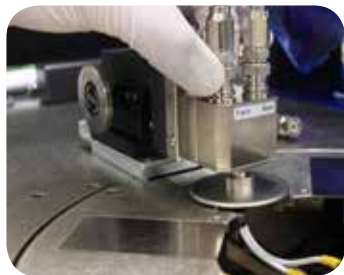
Mount Kelvin Arm and Probe Tip on SE Probe System

1. Mount the Kelvin probe tip and fix it with two screws on the Kelvin arm and with a slotted screwdriver.



2. Fix the Kelvin arm onto the MicroPositioner with two screws and an Allen Wrench.

Fix two screws



3. Load the MicroPositioner on the probe platen and connect the cables onto the Probe Arm Kelvin 50SE.

Mount RF Probe Arm/Probe with MicroPositioner on SE Probe System

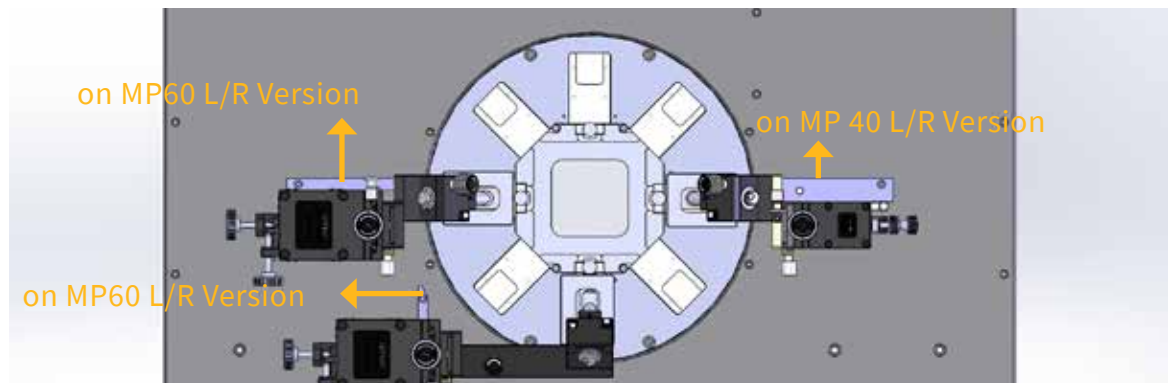
1. Remove the two screws on the probe platen and bolt them to the guide for rectangular adjustment provided in the package of RF Probe Arm on the probe platen by Allen Wrench.



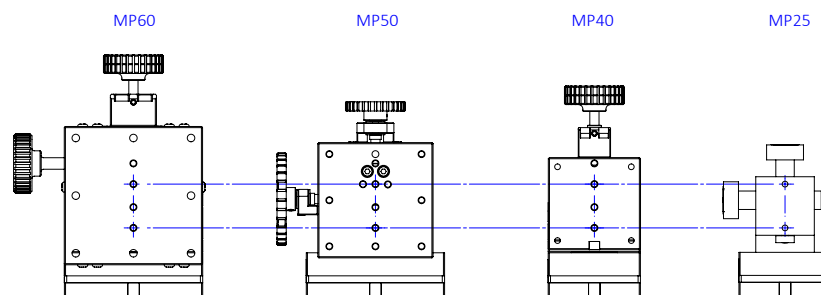
Guide for rectangular adjustment for MP40

To easily operate the MicroPositioner, align it with the guide for rectangular adjustment, move it forward and backward when installing RF Probe and probing.

The Guide for Rectangular Adjustment on MP40 is larger than the one on MP60. Please refer to the purple parts on the figure below.



2. Bolt the RF probe arm adapter onto the MicroPositioner by Allen Wrench; two screws are provided to fix it. The two blue lines on the figure below are the screw locations of each MicroPositioner.



3. One screw supplied to bolt the cable clamp (screwed location depends on the Left or Right version of the MicroPositioner you purchased).



4. Slide the RF probe arm to the MicroPositioner to accomplish the assembly. The height adjustment of the RF Probe arm is ± 5 mm.



1. Cable Clamp
2. RF Probe arm Height Adjustment

5. Fix the probe on the RF Probe Arm by Allen Wrench and screws. The fine micro-meter screw is used for RF Probe planarity adjustment.



1. Fix RF Probe with Allen Wrench
2. RF Probe Planarity adjustment

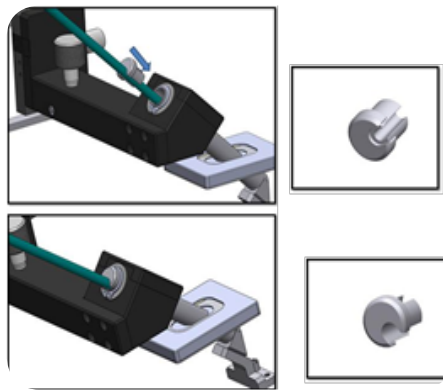
6. Install RF Cable and tighten the connector onto the RF probe.



7. Install the RF Cable Cap.

a. Buckle the RF cable cap on the RF cable and slide it into the hole to keep good shield environment of the probing.

b. Two cable cap sizes are allowed to adjust. When the RF cable is not in use, turn the adjust ring of the cable cap to full.



8. Fix the ShieldCap™ by tightening four thumb screws to secure the ShieldEnvironment™.



Tighten thumb screws

Maintenance and Service

Mechanical Adjustments

These adjustment procedures ensure system accuracy and reliability.

Wafer Chuck Planarization Procedure

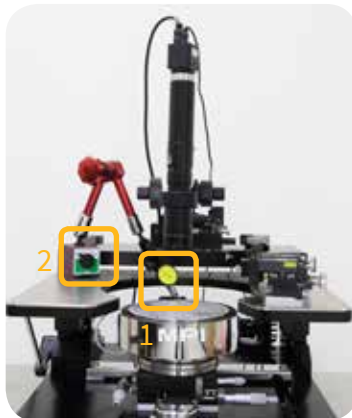


NOTE

Wafer chuck planarization should be performed by a MPI service representative.

Wafer chuck planarization ensures equal probe contact force from tip-to-tip of probes and throughout the wafer chuck range of travel. The wafer chuck is planarized at the factory, but adjustment may be required at installation.

Typically, the wafer chuck will not become unplanarized with use, but if the wafer chuck has been replaced, or if you notice that the wafer chuck begins to lose focus at high magnifications, planarization may be required. Use the dial test indicator connected to the magnetic base to check the chuck planarization near the edge of the wafer chuck and in-line with each planarization screw.



1. Dial Test Indicator

2. Magnetic Base

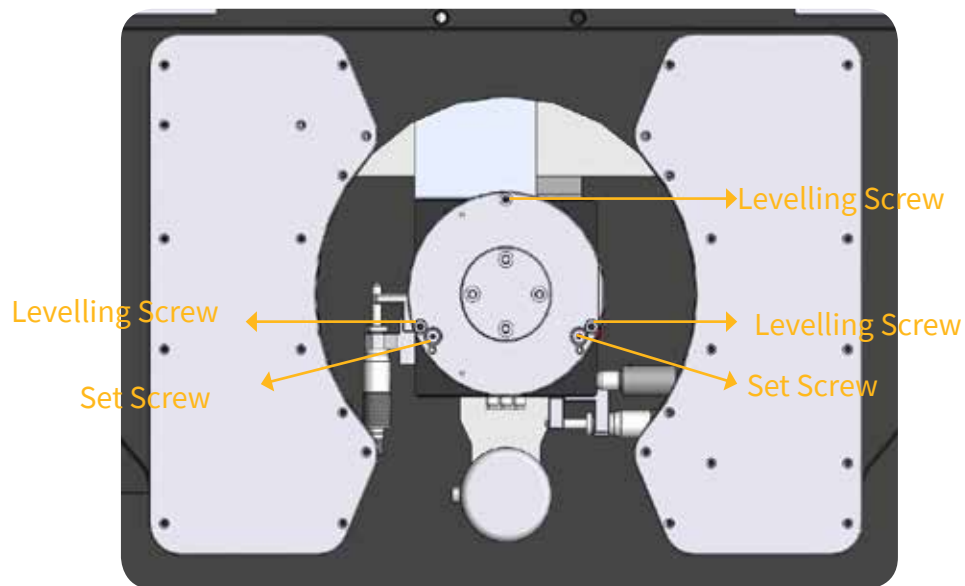
1. Measure the height of the Test Point #1. Test point #1 is the referenced point to the other two will be adjusted.



1. Test Point #1

2. Test Point #2

3. Test Point #3



2. The adjustment of the wafer chuck planarization is up to 10 μm . Higher than 10 μm , wafer chuck planarization procedure has to be executed. Use Allen Wrench to tighten or loosen the screw.

Step 1: Loosen the screw point before adjusting the planarization of the wafer chuck.

Step 2: Tighten the leveling screw to lower the wafer chuck's leveling; tighten the set screw to raise the wafer chuck planarization, if necessary.

Step 3: After the wafer chuck planarization reaches the criterion, tighten the screw point to fix the wafer chuck planarization.

Step 4: Repeat step 1 to step 3 to execute wafer chuck planarization of the last test point.

Microscope Planarization Procedure

Before starting this procedure, ensure that the wafer chuck is planarized (see Wafer Chuck Planarization Procedure). There are three screws located at the back of the microscope bridge which can be adjusted to level the microscope.

1. Move the microscope to its rear most center position.
2. Focus the microscope using the largest magnification, and the coarse and fine adjustment knobs on the side of the microscope.
3. Move the microscope to the most right front and adjust the right-hand screw under the microscope until a sharp image can be seen.
4. Move the microscope to the most left front and adjust the left-hand screw under the microscope until a sharp image can be seen.

Preventive Maintenance

The TS200-SE requires minimal preventive maintenance. Take care to keep the system clean and covered when not in use. The following cleaning and lubrication procedures should be performed at the recommended intervals.



CAUTION

Solvents or other aggressive cleaners are prohibited to use when cleaning this equipment.

Lubrication

The following parts require lubrication once per year:

- Lubricate the microscope movement spindles and the microscope movement bearing rails with NSK Grease PS2 lubricating grease.

General Maintenance

The following checks and tests will greatly improve the overall performance of the probe station.

Visual Checks

Perform a thorough visual check of the system before each use. Key areas include the wafer chuck assembly, X/Y stage, platen separation, microscope movement assembly, individual MicroPositioner, Frequency Extender and the microscope. These parts should be free of dust, residue, and rust.

Instrument Operation

A typical examination of components should include the Z stroke movement, the platen separate/contact/safety load mechanism, and the MicroPositioners as well as the vacuum and air pressure systems.

Pay particular attention to MicroPositioners operation. X, Y and Z travel motion should exhibit complete freedom from any kind of irregular movement.

Check that all lines and cables are installed correctly and regularly checked for malfunctions. Probe arms and tip-holding mechanisms should be secure in their mounts, free from oxidation, and should provide secure mounting of all standard probe tips.

Troubleshooting

This section discusses diagnostic and repair actions for some common issues. This section does not cover invasive troubleshooting or component level repair. Attempting to troubleshoot beyond the instructions in this section may cause further damage to the probe station or related equipment, and may also void the station warranty.

Problem	Solution
The wafer chuck stage is difficult to move	<p>Check that the stage rails and spindles are properly oiled.</p> <p>Check the front panel of chuck control is switched on and the power is connected.</p> <p>Make sure the puck controller knob is pressed so as to move the wafer chuck stage smoothly and easily.</p>
The wafer does not hold on the wafer chuck	<p>Check that the vacuum hose is properly connected and the vacuum pump is switched on.</p> <p>Check the wafer switch is switched on the right wafer size.</p>

Service

Repacking

To retain the validity of the warranty, always use the original packing materials. Contact a MPI representative for replacement shipping materials or hardware. Remove all probes and accessories from the probe system, including the microscope. Do not ship them unless they are associated with the failure symptoms.

Facility Requirements

Requirements	Description	
Air and vacuum	Vacuum	<ul style="list-style-type: none"> Flow rate insignificant -0.5 bar (for single DUT) / -0.3 bar (for wafers) Include 6 mm hose and 6 mm wall fitting
	Compressed air for Vibration Isolation Table	<ul style="list-style-type: none"> Filtered, dry and oil-free Standard: < 0.4 MPa; Advanced: < 0.7 MPa Include 6 mm hose and 6 mm wall fitting
Dimension	Station+ Accessories	<ul style="list-style-type: none"> 670 mm (W) x 785 mm (D) x 815 mm (H) Additional accessories such as dark box, cameras and laser cutters may increase the total height up to 910 mm.
Weight	Probe Station +PSM-1000 Microscope	<ul style="list-style-type: none"> ~150kg (330.7 lb.)
Temperature	Operating range	<ul style="list-style-type: none"> 19° C to 24° C
	Target temperature	<ul style="list-style-type: none"> 22 °C
	Tolerance	<ul style="list-style-type: none"> 1 K
Humidity	Tool area	25% to 60%
	Support equipment area	25% to 60%
Vibrations	The facility should be free of vibrations caused by other equipment.	
Electrical Data	Power	100-240 V AC nominal, 50/60 Hz for optical accessories (e.g. microscope, CCD cameras, monitors) only.
	Protection class	I
	Transient overvoltage	Overvoltage category II (IEC 60364-4-443)
	Facility power line fuse for main connector	Ensure that a 10 A lead fuse is available in your facility power line where the main connector is plugged in.
Clean Room Class	Class 6	
Additional Equipment	Thermal Chuck	See thermal chuck specification
	Test system table	Extra space is required for the test system table next to the probe system.
Shipping Dimension and Weight (approx. values)	Probe station+ Box(approx. values)	1060 mm (W) x 1150 mm (D) x 800 mm (H) / 186 kg
	Probe station+ Vibration Isolation Table (approx. values)	1670 mm (W) x 1585 mm (D) x 1655 mm (H) / 360 kg

PHYSICAL DIMENSIONS

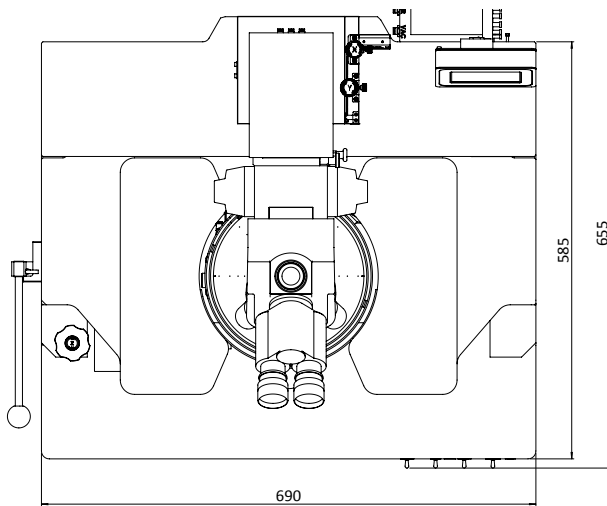
Station Platform with Bridge

Dimensions (W x D x H)

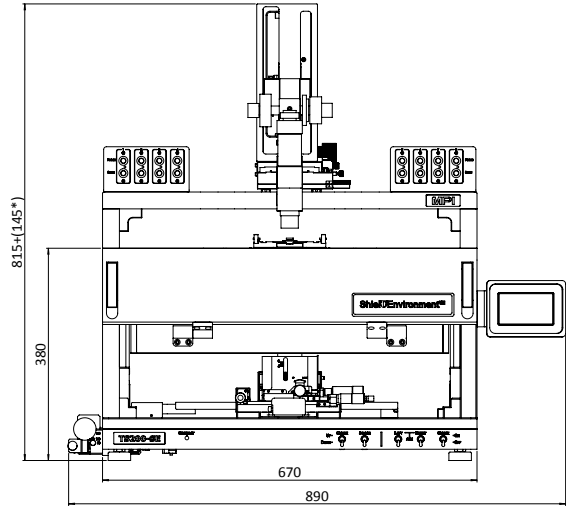
670 x 785 x 815 mm (26.4 x 30.9 x 32.1 in)

Weight

~150 kg(330.7 lb.)



Top View



Front View

Vibration Isolation Table

	Standard	Advanced
Dimensions (W x D x H)	900 x 800 x 835 mm (35.4 x 31.5 x 32.9 in)	900 x 800 x 830 mm (35.4 x 31.5 x 32.7 in)
Feature	Adjustable air damping system	Automatic load leveling
Keyboard / Mouse Tray Included		Yes
Front Protection Bar		Yes
Castors Included		Yes
Shelves Included		Upper and Lower
Accessories Accepted		Monitor Stand(s) and Instrument Shelf
Weight	Approx. 210 kg (463 lb.)	Approx. 210 kg (463 lb.)

