PROBE STATION

USER MANUAL

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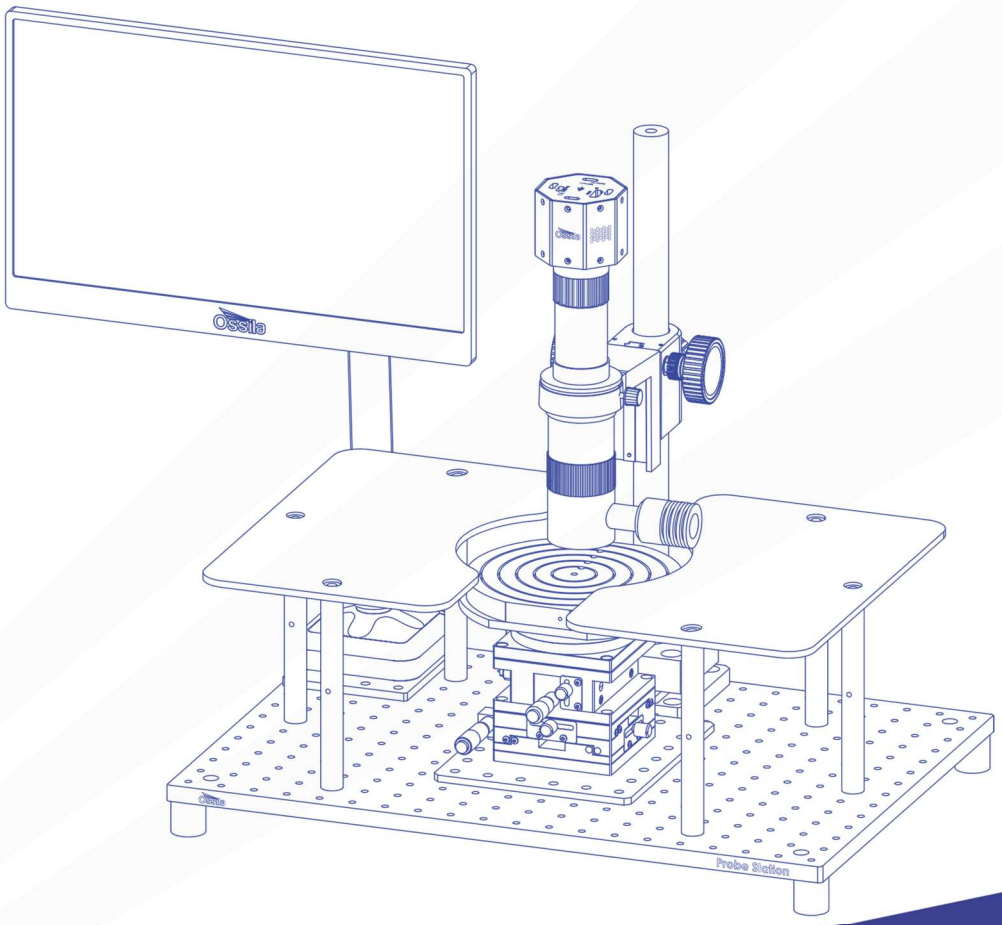

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1. EU Declaration of Conformity

We

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declare that the DoC is issued under our sole responsibility and belongs to the following product:

Product: Probe Station (T2009A1, T2009B1)

Serial number: T2009A1-xxxx, T2009B1-xxxx

Object of declaration:

Probe Station (T2009A1, T2009B1)

The object of declaration described above is in conformity with the relevant Union harmonisation legislation:

EMC Directive 2014/30/EU

RoHS Directive 2011/65/EU

Signed:

Name: Dr James Kingsley

Place: Leiden

Date: 13/08/2025

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2. Safety

WARNING: The user is solely responsible for the safety of any experiment conducted using the Probe Station, which includes ensuring it complies with all local regulations and laws. Any operation exceeding 75 VDC or 50 VAC requires consultation with a certified electrical or site safety professional.

2.1 Use of Equipment

The Ossila Probe Station is designed to be used as instructed. It is intended for use under the following conditions:

- Indoors in a laboratory environment (Pollution Degree 2)
- Altitudes up to 2000m
- Temperatures of 5°C to 40°C; maximum relative humidity of 80% up to 31°C.

The unit is supplied with a 24 VDC power adapter, in accordance with European Commission regulations and British Standards. Use of any other electrical power cables, adaptors, or transformers is not recommended.

2.2 Hazard Icons

The following symbols can be found at points throughout the rest of the manual. Note and read each warning before attempting any associated operations associated with it:

Table 2.1. Hazard warning labels used in this manual.

Symbol	Associated Hazard
	Electrical shock
	General warning or caution, accompanied by explanation text

2.3 General Hazards

Before installing or operating the Probe Station, there are several safety precautions which must be followed and executed to ensure safe installation and operation.

2.3.1 Electrical Hazards

WARNING: The Probe Station and associated equipment are designed to apply currents and voltages to devices under test. Contact with high voltages can cause severe injury or even death from electrical shock.

- Before applying power, ensure all connections are made properly. The user is solely responsible for verifying the correct grounding configuration for their specific experiment. Improper grounding can lead to a shock risk, sparks, or arcs.
- Your experiment may require exposed conductors. It is your responsibility to maintain sufficient clearance and take appropriate precautions to prevent accidental contact with all energized parts.
- Do not operate the system with damaged cables or wires.
- The insulating properties of the equipment may be compromised over time, particularly under prolonged high voltage use or from contamination by fluids or dust. Regularly inspect the Probe Station and its components for signs of wear or damage.
- Any operation exceeding 75 VDC or 50 VAC requires consultation with a certified electrical or site safety professional. They will help you develop a comprehensive safety plan, which may include operating within an interlocked safety shield and using specific personal protective equipment (PPE). The user is ultimately responsible for ensuring the safety of any high-voltage or high-current experiment and for complying with all local regulations and laws.

2.3.2 Mechanical Hazards

WARNING: The Probe Station is heavy, weighing over 21 kg. It also contains spring-loaded parts.

- Use proper lifting techniques and exercise caution when moving the unit to prevent muscle strain or injury. It is recommended to use two people for lifting and repositioning the Probe Station.
- Keep fingers clear of all moving parts, including the chuck translation stage and probes, to avoid being trapped or pinched.

2.3.3 Electrostatic Discharge (ESD)

WARNING: The Probe Station has an insulating base and sample chuck which can lead to the buildup of static charge.

- Always use a wrist strap and ensure you are properly grounded before touching the equipment or any probes.

- Refer to **Section 8.2.2** for detailed instructions on using the dedicated grounding point on the sample chuck.

2.4 Power Cord Safety

The power cord is the primary method of emergency electrical disconnect. The power outlet must always be readily accessible to the operator to facilitate a quick disconnect.

2.5 Servicing

WARNING: Servicing should only be performed by an Ossila engineer. Any modification or alteration may damage the equipment, cause injury, or death. It will also void your equipment's warranty.

If servicing is required, please return the unit to Ossila Ltd. The warranty will be invalidated if:

- Modification or service has been carried out by anyone other than an Ossila engineer, beyond what is specified in this manual.
- The unit has been subjected to chemical damage through improper use.
- The unit has been operated outside the usage parameters stated in the user documentation associated with the unit.
- The unit has been rendered inoperable through accident, misuse, contamination, improper maintenance, modification, or other external causes.

3. Product Overview

The Ossila Probe Station is an all-in-one system designed for the precise and repeatable electrical characterization of electronic devices. The system is built around a heavy, vibration-dampening base that provides exceptional stability and ergonomics. This foundation supports a high-resolution, four-axis movement chuck translation stage, enabling sub-micron precision for fine positional and rotational control of the sample. The system includes a vacuum-compatible chuck with six independently adjustable vacuum zones, capable of accommodating a wide range of substrate sizes, from 5mm to 150mm in diameter.

The base station itself is equipped with two large ferromagnetic stainless-steel platens. They are designed to support up to eight Ossila Micromanipulators, providing exceptional flexibility for complex experiment setups. For visual inspection and accurate probe placement, the Probe Station features a low-distortion monocular zoom lens with a coaxial LED light source that provides bright, shadow-free illumination. This lens is compatible with a dedicated 4K C-mount camera, which displays a high-resolution, real-time view of the device under test. The camera is capable of simultaneous streaming to both USB for image capture to a PC and to HDMI for a lag-free viewing experience on the included external monitor. All necessary visual components are powered by a single, dedicated power supply unit (PSU), simplifying system setup and cable management.

4. Facilities Requirements

The Ossila Probe Station requires a sturdy, level laboratory bench with sufficient space to accommodate the unit and its associated components, including the monitor arm.

- **Footprint:** The unit requires a minimum footprint of (L x W x H) 50 x 35 x 60 cm. Allow additional space for the monitor arm and for access to the rear of the unit.
- **Power:** The supplied 45 W, 24 VDC power adapter must be connected to a suitable power outlet.
- **User Responsibility:** The user is solely responsible for ensuring the operating environment, including electrical supply, grounding, and ventilation, meets all applicable local and national safety standards and regulations. Risk assessments are required for all high-voltage operations.
- **Vacuum:** The sample chuck incorporates vacuum sample holding grooves. The user must provide their own vacuum pump and adapters to connect with the incorporated Ø=6 mm tube push-in connector on the chuck.

5. Unpacking

It is recommended to save the shipping box and all packaging in case your Probe Station must be returned to Ossila for servicing.

Examine the components for evidence of shipping damage. If damage has occurred, please contact Ossila directly for further action. The shipping packaging will come with a shock indicator to show if there has been any mishandling of the package during transportation.

The standard items included with the Ossila Probe Station are shown in **Figure 5.1**.

Figure 5.1. Probe Station Packing Components.

6. System Overview

The standard Probe Station components are shown in **Figure 6.1**. Some Probe Station variants include or exclude certain components of the standard options. Your configuration will be specified on your original order.

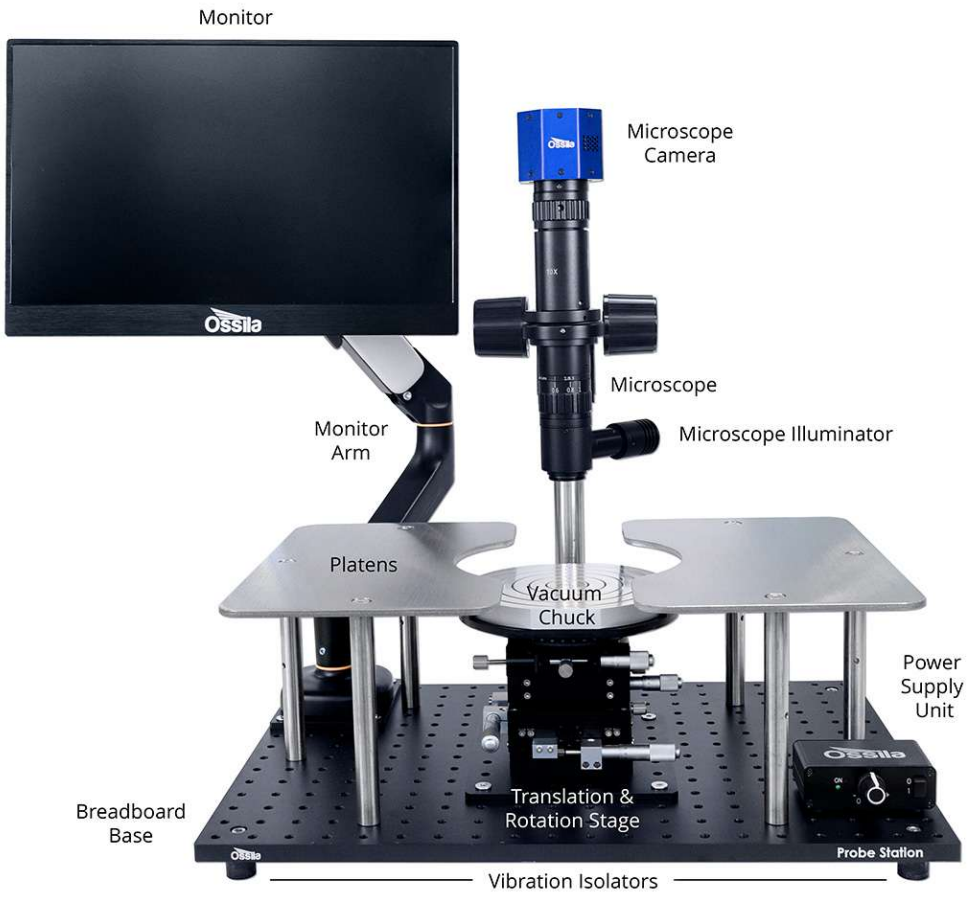

Figure 6.1. Components of the standard Probe Station.

6.1 Technical Specifications

Table 6.1. Ossila Probe Station Base and Platens Specifications.

Base Station & Platens	
Base	Aluminum optical breadboard, 25mm hole spacing
Vibration Isolation	Elastomeric vibration dampening mounts
Natural Frequency	12 Hz
Effective Vibration Isolation	>17 Hz (see **Figure 6.2**)
Maximum Supported Load (isolators)	880 N total
Platen Material	Ferromagnetic stainless steel
Platen Height	150 mm
Platen Capacity	Up to 8 Ossila Micromanipulators

Table 6.2. Ossila Probe Station Chuck Specifications

Chuck Translation Stage	
Stage Travel	25 mm (X, Y), 10 mm (Z), 360° (coarse rotation), 15° (fine rotation)
Stage Resolution	0.01 mm (X, Y, Z), 0.1° (rotation)
Minimum Sample Size	5 mm diameter
Maximum Sample Size	150 mm diameter
Chuck Diameter	155 mm
Chuck Material	Aluminum, conductive anodized
Chuck Type	Vacuum (selectable zones)
Chuck Isolation	>99 MΩ at 500 VDC
Chuck Leakage Current	<75 pA at ± 75 VDC
Vacuum Connection	Ø=6mm Push-In Tube, Female port

Table 6.3. Ossila Probe Station Microscope Specifications

Microscope	
Microscope Type	Monocular Zoom Lens (0.6x – 5.0x optical zoom)
Field of View	9.3 mm – 1.1 mm
Working Distance	86 mm
Camera Sensor	Sony IMX415 (4K, 1/2.8")
Maximum Resolution	4.4 µm line spacing (228 lp/mm)
Live Output	USB 3.0 & HDMI (up to 60 fps at full resolution)
Camera Software Compatibility	UVC-compliant for plug-and-play viewing with Ossila software and most third-party software
Monitor	15.6", 1080p, on a positionable arm
Total Magnification	37x – 309x
Illumination	Adjustable LED (coaxial configuration)

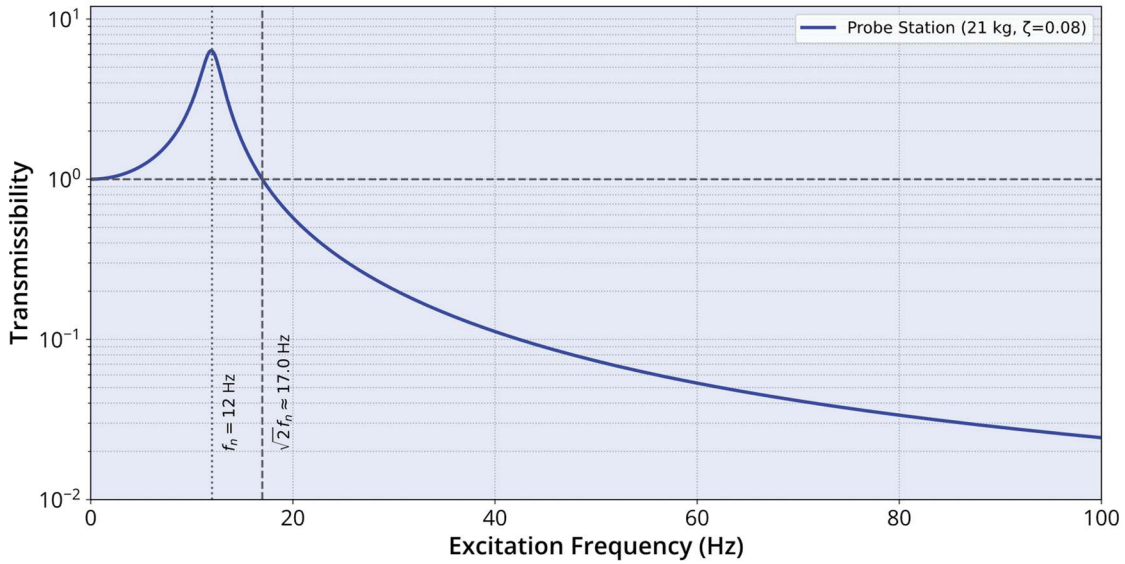

Figure 6.2. Transmissibility of Probe Station Isolation System.

6.2 Software and Computer Requirements

The Ossila USB Camera Viewer software can be downloaded from ossila.com/pages/software-drivers.

See the Ossila USB Camera Viewer software manual for PC requirements and operating instructions.

7. Installation

The Probe Station is shipped partially assembled to ensure safe transit and quick setup. All necessary tools are included with the product. Please review the safety section of this manual before beginning the installation.

All tools required for assembly and installation are included in the package. These include:

- 1.5 mm hex key
- 2.0 mm hex key
- 3.0 mm hex key
- 4.0 mm hex key
- Mounting screws, low head profile
- Spare screws for vacuum chuck

7.1 Base Station and Stage

The base station and chuck translation stage come pre-assembled. Due to the unit's weight (over 21 kg), use proper lifting techniques and caution when moving it.

1. Place the base station on a sturdy, level laboratory bench with sufficient space to accommodate the unit and its components, including the monitor arm.
2. The stage's four axes are locked for transportation. Before using the micrometers, loosen the lock screws on each axis, shown in **Figure 7.1**.

The chuck translation stage operation is described in detail in **Section 8.1.**

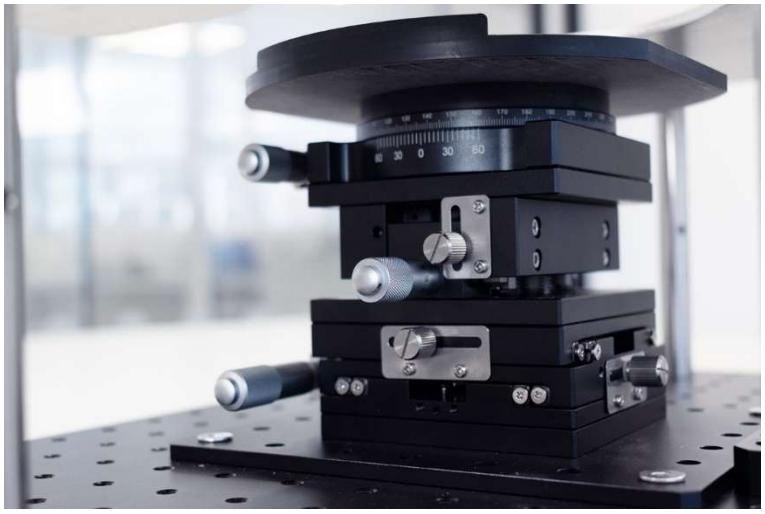

Figure 7.1. Probe Station translation stage, showing the X, Y, and Z stage lock screws.

7.2 Microscope Assembly

The microscope shaft and mounting block are pre-assembled for your convenience. The microscope shaft block is on a sliding base for alignment with the sample chuck.

1. Use the 4mm hex key to remove the four screws from the sliding bars in the shaft mounting plate. These are pre-installed to prevent the sliding bars from falling out during transit. If they fall out during assembly, simply slide them back into the corresponding slots in the baseplate to continue the assembly process.
2. Secure the shaft mounting block onto the plate with the same four screws (M6x20mm) threaded into the sliding bars. Correctly installed, the block will look as in **Figure 7.2**.
3. Note the shaft collar pre-installed onto the shaft about halfway down. Use the 4mm hex key to readjust its position if necessary.

Figure 7.2. The microscope shaft mounting block, correctly installed on the base.

The zoom lens, illuminator, and focus mount are pre-assembled for your convenience. The assembly is shipped with dust caps on all optical apertures, leave in place during installation.

1. Loosen the hand screw on the back of the focus mount to allow the microscope shaft to pass through.
2. Install the focus mount onto the top of the shaft and use the hand screw to lock it in place, as in **Figure 7.3**.

Figure 7.3. Microscope focus mount rear view, showing lock screw on the right, focus knob on the left, and the shaft collar underneath.

3. Carefully remove the Microscope Camera from its box. Remove the dust cover from the camera sensor opening and the top aperture of the microscope assembly.
4. Screw the camera housing onto the top of the microscope.

WARNING: The C-mount has a fine pitch and can be easily damaged if you cross-thread or force it.

5. Use the 2mm hex key to loosen the three top-most grub screws on the zoom lens (as in **Figure 7.4**) to adjust the C-mount rotation collar.

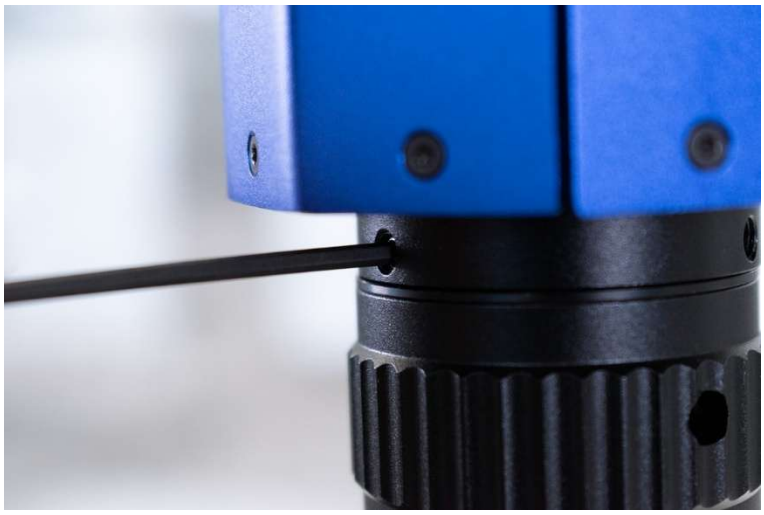

Figure 7.4. Adjusting the C-mount rotation collar to orient the microscope camera.

6. Rotate the camera until the Ossila logo is facing you and the arrow on top points toward the microscope shaft (see **Figure 7.5**). Re-tighten the grub screws to secure the camera's orientation.

Figure 7.5. The microscope camera, correctly oriented to align the image and operator coordinates.

The microscope operation is described in more detail in **Section 8.3**.

7.3 Vacuum Chuck

The sample chuck is an extremely sensitive component. Handle it with care to avoid scratching the surface or damaging the vacuum grooves.

1. Carefully remove the chuck from its box. Align the tab on the chuck holder with the groove on the chuck, then lower it onto the chuck holder (see **Figure 7.6**). The chuck is held in place by gravity—it does not require any fasteners.

Figure 7.6. The vacuum chuck, correctly installed, with the tab of the chuck support aligned with the indent in the edge of the chuck.

2. Connect your 6 mm vacuum tube to the connector on the back edge of the chuck, as in **Figure 7.7**.

3. Ground the chuck to a building ground, your measurement instrument's chassis, or another suitable charge sink using the binding post (see **Figure 7.7**). This is essential for providing a stable electrical reference plane for voltage measurements and for preventing static charge buildup. Always use a wrist strap and ensure you are properly grounded before touching the equipment.

WARNING: The Probe Station has an insulating base and sample chuck which can lead to the buildup of static charge.

Figure 7.7. The vacuum chuck with 6 mm OD tube fitting on the vacuum line and a grounding wire for the chuck.

Additional information about the vacuum chuck operation is detailed in **Section 8.2**.

7.4 Monitor and Arm

The monitor arm can be installed on either the left or right side of the Probe Station.

1. Place the pre-mounted bottom arm's base in the rear corner of the Probe Station base.
2. Use the provided M6 screws and the 4mm hex key to attach the monitor arm base plate to the base breadboard, as in **Figure 7.8**.

Figure 7.8. Monitor arm base plate mounting on breadboard.

3. Insert the metal stud of the top arm piece into the hole of the bottom arm. You can use the 3mm hex key to loosen or tighten the grub screws to adjust the arm, shown in **Figure 7.9**.

Figure 7.9. Monitor arm top piece installation and tension adjustment.

4. Carefully remove the 15.6” monitor from its packaging.
5. Slide the monitor arm bracket into the monitor’s VESA bracket and secure it with the provided thumb screw. See **Figure 7.10** for details.

Figure 7.10. Monitor attachment rear view.

Further information about the monitor operation and monitor arm adjustment is described in **Section 8.5**.

7.5 Power Supply Unit

A dedicated power supply unit (PSU) and illuminator control system is provided to reduce cable clutter.

Figure 7.11. Power Supply Unit front and back panel details.

1. Place the power supply unit on a suitable surface near the Probe Station and a wall power outlet.
2. Plug the microscope illuminator cable into either the L1 or L2 port on the power supply.

WARNING: The L1 and L2 ports on the power supply should only be used for Ossila illuminators, as they supply high current that can damage other equipment.

3. Connect the Microscope Camera power via USB-C to either:
    - A suitable port on your PC using the provided USB-C to USB-A cable,

- The USB-A port on the power supply unit using the USB-C to USB-A cable,
- One of the PD1/PD2 USB-C ports on the power supply unit using a USB-C to USB-C cable.

4. Power the monitor by connecting the  port to a PD1 or PD2 port on the power supply using a USB-C to USB-C cable. Note that the monitor requires at least 24W USB power delivery to prevent flickering.
5. Connect the Microscope Camera's HDMI output to the mini-HDMI port on the monitor using the provided cable.
6. Plug the provided DC power supply into a mains power outlet and connect the barrel connector to the DC 24V input on the power supply unit.
7. Turn on the power supply unit with the front panel switch. The LED indicator should light up confirming power.
8. Test the microscope illuminator by turning the knob on the front panel of the power supply unit.
9. The monitor and microscope camera will boot up within a few seconds. The camera's blue indicator LED will light up when it is powered and transmitting video.

A full description of the PSU operation is provided in **Section 8.6**.

8. System Operation

8.1 Stage Movement

The chuck translation stage provides precise, repeatable movement along four axes: X, Y, Z, and Rotation. Each axis is controlled by a micrometer head for fine-tuning position.

To move an axis, simply turn the corresponding micrometer head. All axes are spring-loaded, which ensures a smooth and controlled return to the home position when the micrometer is retracted.

8.1.1 Locking Mechanisms

Each axis is equipped with one or two thumb screws to lock the stage in place and prevent unwanted movement. All axes are locked during shipping. Before making any adjustments, ensure all lock screws are slightly loosened.

- **Linear Axes (X, Y, and Z):** Each linear axis has a single thumb screw. To lock the axis, gently tighten the screw. To unlock it, loosen the screw.
- **Rotation (R) Axis:** The R axis features a dual-locking system. One screw limits the range of micrometer-driven rotation. The other screw switches the stage between free rotation and micrometer control.

Details of the lock screws are illustrated in **Figure 7.1** and **Figure 8.1**.

Figure 8.1. Details of the chuck translation stage, showing X, Y, Z, and R micrometer controls.

8.1.2 Understanding Axis Travel

The linear axes have specific travel ranges: 25 mm for X and Y, and 10 mm for Z. When positioning your sample, be mindful of these maximum ranges.

If the desired focus point on your sample is outside these limits, you have a few options:

- Manually reposition the microscope head by rotating its mount about the shaft, as in **Figure 8.2**.
- Adjust the position of the sample on the chuck.
- Reposition the entire chuck translation stage on the optical breadboard by unscrewing the bottom plate from the breadboard, repositioning, and screwing it back in.

Figure 8.2. If the maximum stage travel is insufficient, the microscope can be swung left to right on the shaft to allow observation of the sample edges.

If you are turning a micrometer head but the stage is not moving, this indicates you have reached the travel limit.

Do not force the micrometer. Forcing it can damage the internal components. Unscrewing the micrometer head completely risks contaminating the pre-lubricated threads. Reinstalling a fully unscrewed micrometer may cause damage to the unit.

8.2 Vacuum Chuck

The vacuum chuck is a monolithic-type, conductive surface designed to secure a wafer or sample during probing. It features:

- **Vacuum Grooves:** A set of concentric rings milled into the surface of the chuck to apply vacuum pressure to the underside of the wafer.
- **Groove Selection Screws:** A set of sealing screws for individually activating or deactivating specific vacuum zones.
- **Flat Surface:** A precisely machined, flat surface to ensure full contact with the DUT and prevent bending stress.
- **Grounding Point:** A dedicated binding post for grounding the chuck.
- **Vacuum Port:** A 6 mm OD tube push-in port for connecting a vacuum line.

See **Figure 8.3** for a detailed view of the vacuum chuck connections and sealing screws.

Figure 8.3. Detail view of the vacuum chuck.

8.2.1 Selecting a Vacuum Zone

The chuck features six individually selectable vacuum zones optimized for standard wafer sizes. The zones are activated or deactivated using an M2 sealing screw and a 1.5mm hex key. The screw heads are recessed below the chuck surface to maintain flatness.

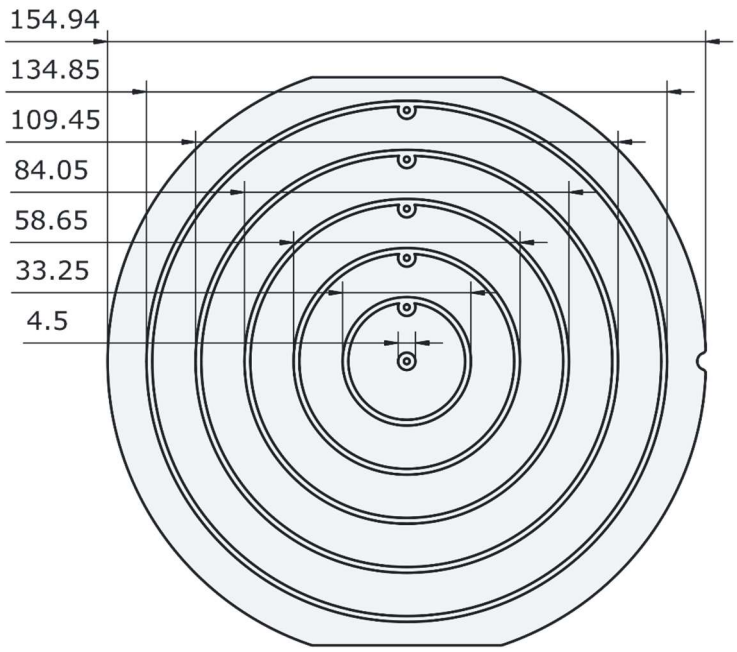

Figure 8.4. Vacuum chuck and groove dimensions.

To activate a zone, carefully remove the corresponding sealing screw using the hex key. For the strongest holding force, activate all zones that are completely covered by your wafer or sample. To deactivate a zone, simply replace the sealing screw.

Table 8.1. Available chuck vacuum zones.

	Diameter	Recommended Wafer Size
Zone 1	4.5 mm	For small DUTs or fragments
Zone 2	1.25” / 33.25 mm	2” / 50 mm wafer
Zone 3	2.25” / 58.65 mm	3” / 75 mm wafer
Zone 4	3.25” / 84.05 mm	4” / 100 mm wafer
Zone 5	4.25” / 109.45 mm	5” / 125 mm wafer
Zone 6	5.25” / 134.85 mm	6” / 150 mm wafer or larger

WARNING: Overtightening the sealing screws can damage the Viton O-ring. Dirt or debris between the O-ring and the point of O-ring contact on the chuck can damage the O-ring or fail to create a suitable vacuum seal.

8.2.2 Grounding the Chuck

The monolithic aluminum chuck includes a dedicated binding post for grounding or applying a reference potential. See **Figure 7.7** for details.

1. Unscrew the cap of the binding post to reveal the transverse hole.
2. Insert the bare conductor of your grounding wire into the hole.
3. Screw the cap back down to clamp the wire securely.

WARNING: The Probe Station has an insulating base and sample chuck which can lead to the buildup of static charge.

8.3 Microscope

The Probe Station microscope system consists of a zoom lens, a focus mount, and an adjustable mounting shaft. It also includes a shaft collar to prevent accidental drops and aid in quick height setting. The zoom lens has a rotary zoom collar for magnification, a coaxial LED light source, a rotary collar to adjust parfocality, and a C-mount thread for a camera. The focus mount has a coarse focus knob and a shaft lock-screw. The components of the microscope are illustrated in **Figure 8.5**.

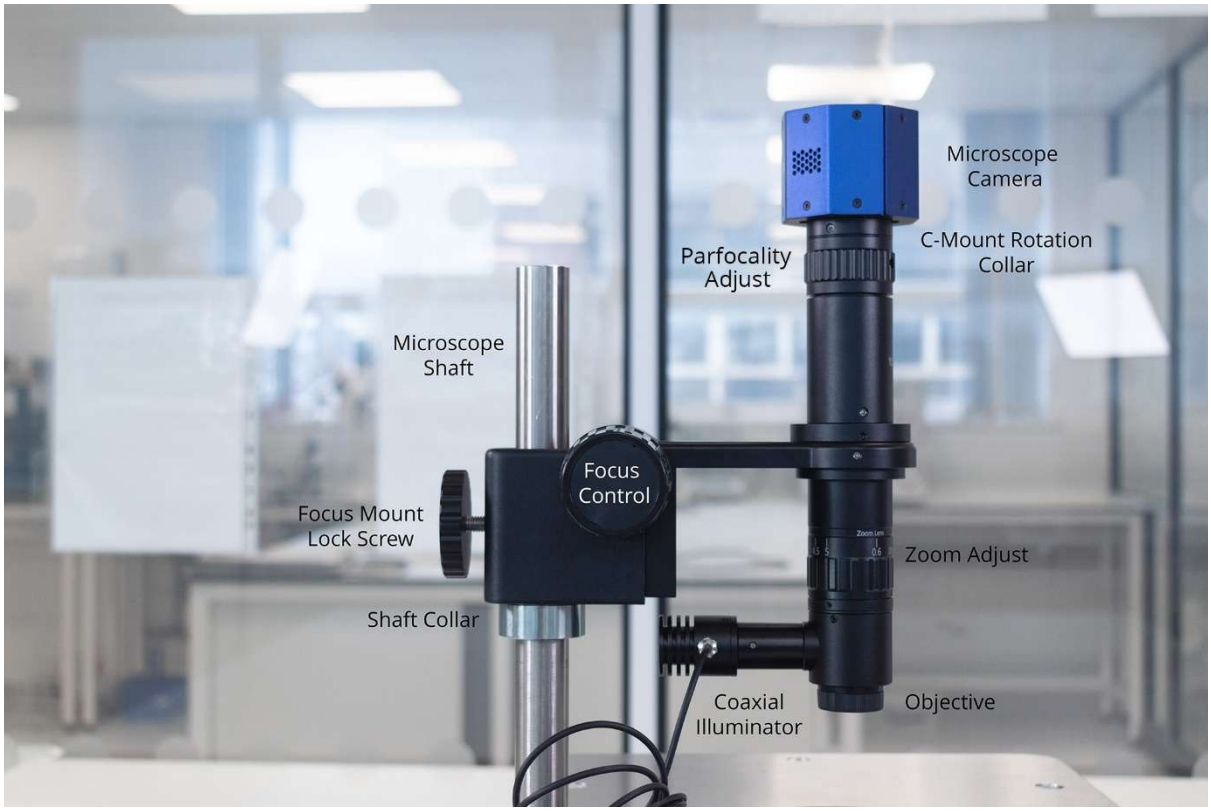

Figure 8.5. Components of the Probe Station microscope.

8.3.1 Positioning the Microscope

To align the microscope with your sample, use the following adjustments:

- **Up/Down (Z-axis):** Loosen the shaft lock-screw on the focus mount to slide the entire microscope assembly up or down along the mounting shaft. The shaft collar should be installed securely underneath the focus mount to act as a safety stop, preventing the microscope from dropping if the lock-screw is loosened completely.
- **Left/Right (Rotation):** With the shaft lock-screw loosened, rotate the focus mount and microscope assembly around the shaft to swing it left or right.
- **Forward/Backward (Y-axis):** The mounting shaft has 12 mm of forward/backward travel. To adjust this, loosen the slide nut screws at the shaft base, slide the shaft, then retighten the screws. This adjustment changes the focus point on the chuck surface but does not change the objective's horizontal distance from the shaft.

8.3.2 Additional Adjustments

- **Zoom Lens Rotation:** The entire zoom lens can be rotated by loosening the three grub screws on the focus mount ring holder, orienting the lens to a desired position, and tightening the screws to secure it.
- **Camera Reference Frame Alignment:** To align the camera's reference frame with the laboratory's, loosen the three grub screws at the top of the microscope where the C-

mount connects. This allows the C-mount threads to be freely rotated. Once the camera's image is correctly oriented, tighten the screws to lock the position.

- **Parfocality Adjustment:** This collar keeps the image in focus when zooming. It should be set once during initial setup (**Section 9**).

8.3.3 Coaxial Illumination

The integrated coaxial LED light provides bright, shadow-free illumination. To operate it, turn the knob on the PSU to adjust the brightness level.

8.3.4 Tips and Best Practices

- **Setting the Shaft Collar for Repeatability:** To quickly return to a specific focus height, you can use the shaft collar. Once you have achieved focus at your desired working distance, tighten the collar's set screw so it is firmly against the underside of the focus mount. This allows you to swing the microscope to the side and return it to the same central position without having to make major Z-axis adjustments.
- **Using the Z-Axis:** For the most precise focus control, rely on the Z-axis of the chuck translation stage. The stage's micrometer provides much finer movement than manual adjustments on the mounting shaft or the focus control knob.

8.4 Microscope Camera

See the Ossila Microscope Camera manual for details.

8.5 Monitor and Monitor Arm

The Probe Station includes a 15.6" diagonal, 1920x1080 resolution monitor mounted on an adjustable arm. This setup provides a high-resolution display for viewing the live video feed from the microscope camera with minimal latency.

8.5.1 Monitor Connections

The monitor has four available ports. The included cables connect the monitor to your system for immediate use.

- **Mini-HDMI: "HD"** This port is the primary video input for the microscope camera. Use the provided Mini-HDMI to HDMI cable to connect the monitor to the camera.
- **USB-C (Power & Video):** This multipurpose port accepts both power and a video signal simultaneously from a single USB-C cable. The included USB-C to USB-C cable is designed to power the monitor and can also be used to receive video feed from a compatible device that supports USB Power Delivery and DisplayPort Alt Mode.
- **USB-C (Video Input):** This port is dedicated for video input from a compatible USB-C source.

- **3.5mm Audio Jack:** This port allows you to connect headphones or external speakers. The microscope camera does not have an integrated microphone and therefore does not output audio via the HDMI cable to the audio jack.

8.5.2 Monitor Buttons

- **Power / Menu:** ⏻\⮌ Quick press once to bring up the Source Select Menu. Long press to power on or power off the monitor.
- **Toggle Select:** Toggle the switch towards the + to highlight the selection above. Toggle the switch towards the — to highlight the selection above. Press the Toggle Select button to select the highlighted option.

8.5.3 Adjusting the Monitor Arm

The monitor is attached to a spring-loaded, adjustable arm, which allows you to position the display for optimal viewing comfort.

- **Vertical Height:** The arm's vertical position can be adjusted by moving the monitor up or down. A tensioning mechanism allows the monitor to be positioned and held in place at a particular height without springing back. To adjust the tension, use a 4mm hex key to turn the screw at the middle joint. Turn the screw clockwise to increase tension and counterclockwise to decrease tension. See **Figure 7.9** for details of the tensioning mechanism.
- **Horizontal Position:** The arm's base can rotate, and the top arm can pivot, allowing you to swing the monitor left, right, forward, and backward.
- **Tilt and Rotation:** The VESA mount on the monitor allows you to tilt the screen left/right and up/down for precise viewing angles. The friction of the tilting joint on the arm nearest to the back of the monitor can be adjusted. Use a 5mm hex key to turn the screw: clockwise to tighten and counterclockwise to loosen. See **Figure 7.10** for a detailed view of the tilting adjustment mechanism.

8.6 Power Supply Unit

A dedicated power supply unit (PSU) powers the Probe Station. This unit distributes power from the included 24VDC, 45W universal power adapter to all the electric components that come with the system.

8.6.1 Front Panel Controls and Indicator

Figure 8.6. PSU front panel showing power indicator, illuminator adjustment knob, and power switch.

The front panel (**Figure 8.6**) provides direct control over the system's power and illumination.

- **Power Indicator LED:** This illuminates when the primary power switch is in the "On" position, indicating that the PSU is active.
- **Illuminator Dimmer Knob:** This controls the brightness of the microscope illuminators. Turning the knob clockwise increases the brightness ("+"). When the knob is turned all the way counterclockwise, ("0"), it clicks off, cutting power to the illuminator ports (L1/L2). When this is switched off, all other output ports remain active as long as the primary power switch is on.
- **Master Power Switch:** This switch controls the power to all output ports on the PSU. When the switch is in the On ("1") position, power is supplied to all outputs.

8.6.2 Rear Panel Connections

Figure 8.7. PSU rear panel showing the DC power input jack, two illuminator ports (L1, L2), a USB-A power port, and two USB-C power delivery ports (PD1, PD2).

The rear panel (**Figure 8.7**) provides all connection points for external power input and outputs.

- **DC Power Input:** This barrel jack is the main power input for the PSU. Connect the included 24 VDC, 45W universal power adapter to this port.

- **Illuminator Ports (L1/L2):** These two 3.5 mm jacks are designed to drive microscope illuminators. They provide up to 350 mA of current, which is controlled linearly by the dimmer knob on the front panel. Both ports are identical in electrical output.

WARNING: Ports L1 and L2 have the form factor of a standard audio jack but are not for audio. Plugging any audio device into these ports will cause permanent damage to the audio device or the Probe Station PSU. These ports are for use **only** with Ossila microscope illuminators.

- **USB-A Port:** This port provides 5V, 1A power output. It is for power only and does not support data transfer. Power to this port is controlled by the primary power switch.
- **USB-C Power Delivery Ports (PD1/PD2):** These two ports are USB Power Delivery (PD) outputs. They are for power only and do not support data transfer. Power to these ports is controlled by the primary power switch.

8.6.3 Power Management and Limitations

The total power output of the PSU is limited by the 45W input from the supplied DC power supply. The PSU can dynamically adjust its output to each port (e.g., the USB-C PD ports) based on the Power Delivery protocol. While the total power draw of the standard Probe Station components (illuminator, camera, and monitor) is approximately 12 W, be mindful that the combined power draw of these devices and any additional connected devices should not exceed the 45 W limit. If the total power draw is exceeded, the PSU may reduce power to some or all the output ports to protect the system.

9. System Alignment, Focusing, and Parfocality Adjustment

Accurate alignment and calibration of the microscope with the chuck translation stage is essential for reliable and repeatable measurements. This process should be performed after the initial system installation and whenever the system is moved or reconfigured.

1. **Set Initial Height:** Loosen the focus mount lock-screw (**Figure 7.3**) and carefully raise or lower the entire microscope assembly until the objective is approximately 86 mm from the chuck surface. This is a good starting point for achieving focus. Lock the focus mount in place.
2. **Rough Focus at Low Magnification:** Turn the microscope's zoom knob (**Figure 8.5**) to its minimum magnification (0.6x) for the widest field of view. Use the focus adjust knob on the focus mount to bring the surface of the chuck into clear focus. If you reach the limit of the knob's travel, re-adjust the coarse height of the microscope on the shaft.
3. **Center the Chuck:** Adjust the X, Y, and Z axes of the stage (**Figure 8.1**) so that they are at the midpoint of their travel and the chuck is centered on the Probe Station.
4. **Align Microscope Optical Axis:** Loosen the focus mount lock-screw and rotate the microscope assembly to center it over the chuck. Loosen the shaft mount block screws (**Figure 7.3**) and slide the entire microscope sub-assembly forward or backward until it is also centered. Retighten all screws securely once aligned. Check the central vacuum hole on the chuck is within the microscope's field of view.
5. **Achieve Focus at High Magnification:** Turn the zoom collar (**Figure 8.5**) to its maximum magnification (5.0x). Use the main focus knob to achieve a perfectly sharp image. Do not move the main focus knob from this point forward.
6. **Adjust Parfocality:** Slowly turn the zoom collar back to its minimum magnification (0.6x). The image will likely be out of focus. Adjust the parfocality collar (**Figure 8.5**) at the top of the zoom lens until the image is back in sharp focus.
7. **Verify Adjustment:** Zoom back in to the maximum magnification. The image should remain in sharp focus. If it does not, repeat the parfocality adjustment process until the image stays in focus throughout the entire zoom range.
8. **Finalize Workspace:** Once the system is parfocal, adjust the monitor arm for comfortable viewing while working at the Probe Station. For precise fine focus during use, rely on the Z-axis control of the stage.

10. System Maintenance & Cleaning

For optimal performance, periodically check the system's alignment (**Section 9**) and keep the components clean using the guidelines below.

10.1 Chuck

The aluminum chuck is durable but requires proper cleaning to ensure a good vacuum seal and electrical contact.

- **Surface:** Wipe with a soft, lint-free cloth lightly dampened with isopropyl alcohol.
- **Vacuum Grooves:** Use a small, stiff brush with isopropyl alcohol to clear debris. Compressed air or a vacuum can be used for loose particles.

10.2 Microscope Optics & Camera

Optical surfaces are delicate and easily damaged. Never use isopropyl alcohol or general-purpose cleaners on them.

- **Dust:** Use a blower bulb to gently puff away loose dust.
- **Smudges/Fingerprints:** Apply a small amount of optical lens cleaning solution to a proper lens tissue (not a regular cloth). Gently wipe the lens in a spiral motion from the center outwards.

10.3 Monitor

The screen has an anti-glare coating that can be damaged by alcohol or harsh chemicals.

- **Dust:** Wipe gently with a dry, soft microfiber cloth.
- **Smudges:** Lightly dampen the microfiber cloth with a small amount of monitor-specific cleaner or distilled water. Never spray liquid directly onto the screen.

10.4 Base Station

The main body of the Probe Station is designed to be robust and chemically resistant.

- **General Cleaning:** A lint-free cloth lightly dampened with isopropyl alcohol is safe and effective for all structural components, including the breadboard, metal posts, and plastic parts.

11. Troubleshooting

Most of the issues that may arise will be detailed here. However, if you encounter any issues that are not detailed here, contact us by email at info@ossila.com.

11.1 Power and System Issues

Problem	Possible Cause	Action
The entire system is off (no lights on the PSU, camera, or monitor)	The main 24 VDC power adapter is not correctly connected to the mains power or the PSU.	Ensure the power adapter is securely plugged into a working wall outlet and that the barrel connector is firmly inserted into the “DC 24V” input on the rear of the PSU, and the primary power switch is in the On (“1”) position.
	The power adapter or the PSU has a fault.	Contact Ossila for support.
The monitor or camera is not receiving power, but the PSU power light is on.	The USB power cables for the components are not correctly plugged into the PSU or the device.	Check that the USB-C cables for the monitor and camera are securely connected to the appropriate power output ports (PD1/PD2 for the monitor, any USB port for the camera) on the PSU.
	The total power draw from all connected devices exceeds the 45 W limit of the power adapter.	Disconnect any non-essential devices from the PSU.

11.2 Microscope and Imaging Issues

Problem	Possible Cause	Action
The microscope illuminator does not turn on.	The illuminator cable is not set up properly.	Ensure the 3.5mm illuminator cable is securely plugged into either the L1 or L2 port on the rear of the PSU and the dimmer knob is turned clockwise to enable power.
	The PSU has a fault with the L1 and/or L2 outputs.	Contact Ossila for support.

No image is displayed on the monitor.	The camera or monitor are not powered on.	Check that both USB power cables are connected and that the indicator lights are lit.
	The HDMI cable is not connected properly between the camera and the monitor.	Ensure the HDMI cable is securely connected to the HDMI output on the camera and the mini-HDMI input on the monitor.
	The scene may be too dark, resulting in an effectively black image displayed on the screen.	Increase the brightness of the scene using the microscope illuminator or other light source.
The image on the monitor is flickering	The monitor is not receiving sufficient power.	Ensure the monitor is powered using a USB-C to USB-C cable connected to one of the high-power PD1 or PD2 ports on the PSU. The standard USB-A port may not provide enough power.
	The power cable is plugged into the wrong port on the monitor.	Ensure the USB-C power cable is plugged into the  port on the monitor.
The image is blurry or cannot be focused.	The microscope's working distance is incorrect.	Follow the alignment and focusing procedures in **Section 9**.
	The objective lens or camera sensor is dirty.	Clean the optical surfaces according to **Section 10.2**.

11.3 Mechanical and Stage Issues

Problem	Possible Cause	Action
A stage axis (X, Y, Z, or Rotation) will not move when the micrometer is turned.	The stage has reached its mechanical travel limit (e.g., 25 mm for X and Y).	Reposition the sample on the chuck, reposition the microscope head, or reposition the entire stage assembly on the optical breadboard base.
	The locking thumb screw for that axis is engaged.	Slightly loosen the locking screw for the corresponding axis.
Excessive vibration transmission from the bench to the Probe Station.	The combined weight of the Probe Station and additional equipment exceeds the isolator rating.	Verify that the total weight on the isolators is less than 880 N (89 kg). Remove excess accessories or

		redistribute the load to prevent isolators from bottoming out.
	The dominant vibration frequency in the lab is below the effective isolation range (17 Hz).	Use an alternative isolation system (e.g., pneumatic, or active isolation table).

11.4 Vacuum Chuck Issues

Problem	Possible Cause	Action
The vacuum chuck is not holding the sample securely.	The external vacuum pump is off, disconnected, or malfunctioning.	Ensure your vacuum pump is turned on, working, and the 6mm tubing is securely connected to the port on the chuck.
	Incorrect vacuum zones are activated for the sample size.	Ensure that sealing screws are removed *only* for the vacuum zones that are fully covered by your sample. All other unused zones must have their sealing screws installed to prevent leaks.
	A sealing screw's O-ring is damaged or dirty, preventing a proper seal.	Inspect the sealing screw and O-ring. Clean or replace if necessary. Do not overtighten the screws.
	The chuck surface or vacuum grooves are dirty, preventing the sample from sitting flat.	Clean the chuck surface and grooves according to the procedures in **Section 10.1**.
Electrical measurements are noisy or unstable.	The chuck is not properly grounded, leading to static buildup or a floating reference potential.	Connect the chuck's dedicated grounding post to a suitable building ground or the chassis of your measurement instrument. Always use an anti-static wrist strap when handling sensitive devices.

12. Related Products

Probe Tips

Precise probing begins with quality tips. Choose from pure tungsten or BeCu, available in various tip sizes.

Product codes: T3008A1 / T3008B1 / T3008C1

Flat Tip Tweezers

Provides a good substrate grip without scratching.

Product code: C121

Triaxial-to-Coaxial Adapters

Easily and affordably adapt coaxial test fixtures to triaxial-connectorized instrumentation.

Product code: C2022

Triaxial Cable Assembly

Ensure consistent and accurate data acquisition with an affordable cable you can rely on.

Product code: C2023A1

Micromanipulator

Manual manipulation for intuitive positioning control in advanced applications. Available in 10 µm or 5 µm resolutions.

Product codes: T2007A1 / T2007B1

Differential Interface

Quickly and easily convert unipolar connections to a differential coaxial output.

Product codes: T3007A1

Probe Station Platen Set

Simply mount on a breadboard using standard optical posts to build your own custom probing setup.

Product code: T3009A1

Source Measure Unit

Source voltage, measure current, get data. Simplify and accelerate your data collection!

Product code: P2005A2

Universal Tool Clamp

Precisely manipulate a wide variety of tools and devices using your micromanipulator.

Product code: T2007C1

Microscope Camera

Crystal-clear resolution with a lag-free HDMI monitor feed and high-speed USB capture.

Product code: T2010A1