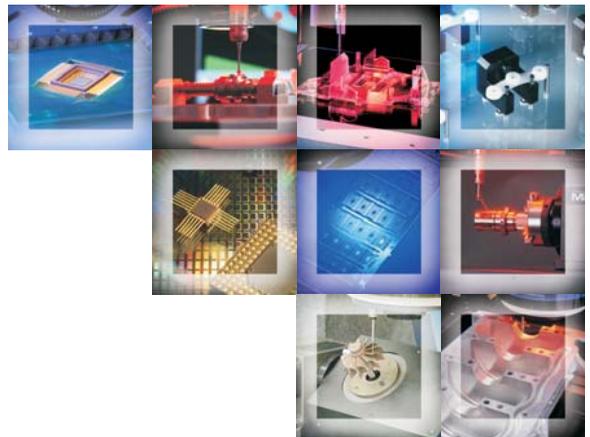




**Optical Gaging  
Products, Inc.**

 A QUALITY VISION INTERNATIONAL COMPANY



**SmartScope® Flash  
624/1500/1550  
Hardware  
Installation Guide**

This document was produced by the Marketing Communications Department of Quality Vision International, Inc. 850 Hudson Ave., Rochester, New York 14621-4896 USA. Telephone: 585-544-0450. FAX: 585-338-0131. E-mail: webmaster@qvii.com.

### **Warranty**

Optical Gaging Products, Inc. (OGP® company) warrants each new SmartScope to be free from defects in material and workmanship for a period of one year from the date of shipment. OGP's obligation under this warranty is expressly limited to the replacement and installation of a part or parts found to be defective by our inspection. This warranty is valid only if the system is given normal and proper usage, and is operated and serviced according to the technical documentation supplied with the system. The information in this manual is subject to change without notice.

OGP does not warrant that the operation of the system software will be uninterrupted or error-free. This warranty does not apply to defects resulting from customer supplied or configured computer equipment, operating systems or software, unauthorized alteration or misuse, or operation outside the environmental specifications for the product.

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### **Caution**

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this documentation, may interfere with radio communications. Operating this equipment in a residential area may cause unacceptable interference to radio and TV reception, requiring the operator to take whatever steps are necessary to correct the interference.

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# About This Guide

Welcome!

Optical Gaging Products (OGP) has produced this *Hardware Installation Guide* as part of its ongoing effort to provide users with useful, comprehensive documentation. This manual has been developed using documentation standards and a design that enhances readability and makes it easier to find information.

This manual will assist you in the installation and setup of the SmartScope Flash 624/1500/1550 system. If you have any questions that are beyond the scope of this manual, contact your local authorized OGP Representative or OGP directly.

## Organization

---

This manual contains the following sections:

**About This Guide** (this section), describes the content and organization of this manual, defines who should read this manual and the prerequisite knowledge required to make full use of this information, lists related publications, explains special symbols used in this manual, and provides information regarding OGP technical support and customer service.

**For Your Safety**, provides an overview of the necessary safety precautions to be observed whenever operating, installing, or servicing the system.

**Section 1, Operating Environment**, provides equipment dimensions, defines space and electrical requirements for installation, and discusses environmental considerations.

**Section 2, Installation**, outlines procedures for unpacking and installing the system, and describes how to power up the system.

## Who Should Read This Manual?

---

Read and familiarize yourself with this manual if you will be involved with the initial installation and/or setup of the system.

## Prerequisite Knowledge

---

Before using this manual, you should be familiar with:

- Basic electrical and mechanical terminology
- How to read and interpret cabling diagrams

## Related Publications

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- *Measure-X FastStart Guide* (P/N 790280)
- *Measure-X Reference Guide* (P/N 790230)
- *MeasureMind 3D MultiSensor FastStart Guide* (P/N 790321)
- *MeasureMind 3D MultiSensor Reference Guide* (P/N 790322)
- *SmartScope Flash/Flare Calibration and Alignment Manual (Measure-X Systems)* (P/N 790260)
- *SmartScope Flash/Flare Calibration and Alignment Manual (MeasureMind Systems)* (P/N 790345)

For a complete list of OGP documentation, contact your local authorized OGP Sales or Service Representative.

## Documentation Conventions

To help you locate, interpret, enter or select information easily, this manual uses consistent visual cues and standard text formats. These documentation conventions are explained in the following table.

Type Style or Symbol	Used for	Examples and Explanations
<b>Bold</b> or <i>italic</i>	<ul style="list-style-type: none"><li>Emphasized words</li></ul>	<ul style="list-style-type: none"><li>Do <b>not</b> repeat this step</li><li>Select the <i>highest</i> magnification level</li></ul>
<b>Bold, sans-serif typeface</b>	<ul style="list-style-type: none"><li>Commands to be typed</li><li>Keys to be pressed</li><li>Menu items to be selected</li><li>Buttons to be pressed</li></ul>	<ul style="list-style-type: none"><li>Type <b>exit</b></li><li>Type the following command, and then press <b>Enter</b></li><li>Select <b>Reset</b> from the <b>System</b> pull-down menu</li><li>Press the <b>Stop/Start</b> button</li></ul>
⇒	<ul style="list-style-type: none"><li>Pull-right menus</li></ul>	<ul style="list-style-type: none"><li>Select <b>Calibration</b> ⇒ <b>Linear</b> from the <b>System</b> pull-down menu</li></ul>
<b>BOLD, ALL CAPS, SANS-SERIF, CENTERED TYPEFACE</b>	<ul style="list-style-type: none"><li>System message</li></ul>	<b>SELECT THE CORNER WITH THE LEFT MOUSE BUTTON.</b>
Initial caps	<ul style="list-style-type: none"><li>Proper nouns</li><li>Product names</li><li>Sections, figures</li></ul>	<ul style="list-style-type: none"><li>Use the Measure function</li><li>SmartScope Flash 1500</li><li>See Section 2</li></ul>
ALL CAPS	<ul style="list-style-type: none"><li>Acronyms</li></ul>	<ul style="list-style-type: none"><li>ASCII; OGP</li></ul>

## Special Symbols Used in this Guide

---

Throughout this manual, you will find special information and symbols set apart from the body text as *Warnings*, *Cautions*, and *Notes*. These terms and symbols are explained below.



---

**WARNING:** Warns you of the possibility of personal injury due to electrical shock when performing a task related to the subject matter of this manual.

---



---

**WARNING:** Warns you of the possibility of other personal injury when performing a task related to the subject matter of this manual.

---

For either of the above two warnings, follow all instructions precisely to ensure your safety.



---

**CAUTION:** Alerts you to the potential for damage to the system hardware or software. Special instructions may be included for minimizing this risk.

---

---

**Note:** Provides additional information related to the topic being discussed.

---

## Technical Support and Customer Service

---

OGP offers service and support contracts that are tailored to meet your specific needs and protect the value of your investment:

- **Hardware service contracts** for cleaning, general inspection, preventive maintenance and certification — includes a discount on replacement parts and emergency service labor rates
- **Software support contracts** with updates of software products, application assistance, and a discount on new software products

For more information, call (585) 544-0400.

## If You Need Help

---

For help, contact your local authorized OGP Representative first. If he or she cannot solve your problem, contact us —

- By phone at (585) 544-0400
- By FAX at (585) 544-8092 (Sales) or (585) 544-0131 (Service)
- By e-mail at *sales@ogpnet.com* or *service@ogpnet.com*
- On the Internet at <http://www.ogpnet.com>

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---

# For Your Safety

For your personal safety, review the safety information presented in this section. It is provided for your protection, to avoid injury, and to prevent damage to your OGP system. Any use of the OGP system not specified, or failure to comply with the precautions or specific warnings stated elsewhere in this manual, violates safety standards of design, manufacture, and intended use of this equipment. Violation of safety standards or misuse of this system may cause damage or injury.

---

## Safety Guidelines

---

Observe the following general safety precautions during all phases of installation, operation, and maintenance of this equipment.

### Power and Grounding

- The source of power connected to the system should not apply more than the rated voltage (specified on the machine identification/name plate) between the supply conductors or between either supply conductor and ground.
- The system is grounded through the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle with an earth ground connection.
- Without a protective ground connection, all accessible conducting parts of the system are potential shock hazards. This includes knobs and controls that may appear insulated.



---

**WARNING: A protective ground connection is essential for safe system operation.**

---

## Power Cord

- Use only the power cord specified for the system. If you must use an extension cord, make sure that it is grounded and is of the proper type and wire gage.
- Do not operate the system if the power cord is damaged.
- Position the power cord so that it will not be a trip hazard or come in contact with a hot surface.

## Fuses



---

**WARNING:** To avoid a fire hazard, use only fuses that meet all type, voltage, and current requirements as specified by OGP.

---

## Covers and Panels

The system covers and panels should only be removed by qualified personnel.



---

**WARNING:** To avoid personal injury, do not operate the system without covers and panels properly installed.

---

## Stage Glass

The stage glass is not designed to withstand excessive weight or rough handling. The load capacity specified in the system data sheet refers to the maximum amount of weight that can be fixtured to the stage, not the amount of weight that the stage glass can support.



---

**WARNING:** The stage glass is not shatterproof. To avoid personal injury, do not drop anything on the stage glass.

---

## Before Servicing

Servicing the system should only be performed by qualified personnel.



---

**WARNING:** Power down the system and disconnect the power cord before servicing the system.

---

## Liquids



---

**WARNING:** Keep water and other liquids away from the system, to reduce the risk of spillage and electrical shock.

---

## Accessories



---

**WARNING:** Do not use any accessory attachments other than those provided or approved by OGP. Improper accessories can cause fire, electrical shock, and/or personal injury.

---

## Unsafe Operating Environments

Do not operate the system in the following environments, where specific regulatory compliance is required.

### Medical



---

**WARNING:** Do not operate the system in hospitals, clinics, or laboratories, where sensitive patient monitoring equipment may be affected.

---

### Radioactive (Nuclear)



---

**CAUTION:** The system electronics are not radiation-hardened. Do not operate the system in a radioactive environment.

---

### Explosive Atmosphere



---

**WARNING:** Do not operate the system in environments where flammable gases and vapors or explosive dust are present. These could be ignited by the heat or sparks which may be generated by the system.

---

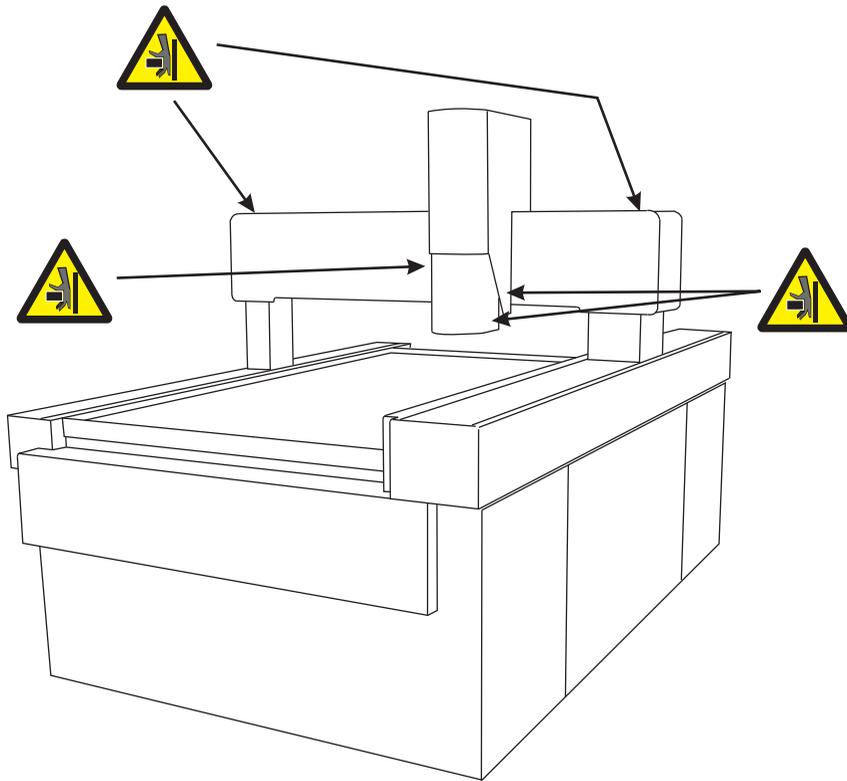
# Safety Markings on OGP Equipment

- When affixed to OGP equipment, the following *terms* mean —
  - **CAUTION** indicates a **potential personal injury hazard** or a hazard to property, including the machine itself
  - **DANGER** indicates an **immediate personal injury hazard**
- When affixed to OGP equipment, the following *symbols* mean —

Symbol	Meaning	Symbol	Meaning
	Electrical Danger		Do Not Lift
	Caution		Do Not Touch
	Hot Surface		Protective Conductor Terminal
	Pinch Hazard		Earth (Ground) Terminal
	Electrical Shock Hazard		Fuse Label

## Location of External Safety Markings

---



For  
Your Safety

## SmartRing Light Safety Guidelines

---



The SmartRing light is a Class 2 LED product. Do not stare into the illuminated LED beams or view them directly with optical instruments. Prolonged viewing of direct LED beams may be hazardous to the unprotected eye. However, momentary viewing (0.25 seconds) is not considered hazardous.

The LED safety label is located on the right-hand side of the SmartRing light.

## Laser Safety Guidelines (Applies Only to Systems Equipped with a Laser)

---



---

**WARNING:** Read the laser safety information carefully and follow all safety precautions. Not following safety precautions could result in hazardous radiation exposure to your eyes.

---



---

**WARNING:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

---

The laser source is a laser diode. The laser energy is not dangerous to exposed skin. However, if viewed directly or from a reflection of a specular (mirror-like) surface, the emitted light from the source may be harmful to the human eye.

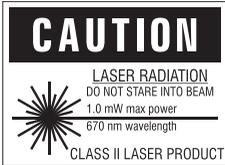
The laser sensor conforms to laser safety regulations set forth by the Code of Federal Regulations 21 (CFR 21) and submitted to the Center for Devices and Radiological Health (CDRH). The laser also conforms to IEC-825 (1993) laser safety regulations specified by the International Electrotechnical Commission (IEC).

The laser sensor meets Class II requirements of the CFR 21 standard and Class 2 requirements of the IEC-825 European standard.

## Laser Safety Markings

---

The following laser safety labels appear on the laser and indicate its compliance with CDRH and IEC-825 regulations.

Safety Label	Meaning
	International Laser Symbol
	IEC-825 Laser Safety Classification
	CDRH Laser Safety Classification
	Laser Aperture Warning

## For More Laser Safety Information

---

For information on the location and function of the laser indicator LED on the system, refer to the user manual for your laser.

For more information on laser safety, contact the Laser Institute of America ([lia@laserinstitute.org](mailto:lia@laserinstitute.org)) and ask for ANSI specification number Z136.1-1993. The Laser Institute of America also offers other booklets and information on laser safety.

## Lockout Procedure

---

Before servicing the system, you must unplug the power cord and lock out the system to protect you and others from unintended system operation, which could cause personal injury. No one should attempt to defeat a lockout while the machine is being serviced.

## Lockout Sequence

---

1. Notify all affected employees that you are going to disconnect and lock out the machine, as well as the intended reason for the lockout.
2. Perform the standard System Shutdown procedure:
  - Exit the metrology software and close any open programs.
  - Shut down Windows and power down the QVI Controller.
3. Unplug the system power cord from the power outlet and disconnect it from the power strip.
4. Unplug the QVI Controller power cord from the power strip and disconnect it from the controller.
5. After making sure that no personnel are exposed to danger, operate the joystick to ensure that all power is disconnected from the machine. When you are satisfied that the machine is locked out and secure, you may service the machine.

## Restoring a Machine to Normal Operation

---

1. Check the area around the machine to ensure that no one is exposed to danger.
2. After determining it is safe, reconnect the QVI Controller power cord — plug it into the power strip and QVI Controller power cord receptacle.
3. Reconnect the system power cord — plug it into the power strip and an appropriate power outlet.
4. Power up the QVI Controller and launch the metrology software.
5. Ensure that power has been restored by verifying that the machine LEDs and fans are on.

# Section 1

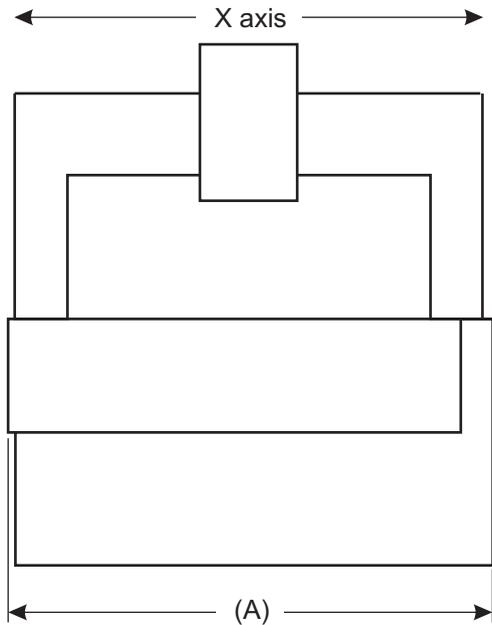
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## Operating Environment

This section covers the following:

- Equipment dimensions and space requirements for installation
- Electrical requirements
- Environmental considerations

# Equipment Dimensions and Space Requirements



	Flash 624	Flash 1500	Flash 1550
<b>Width (A)</b>	123 cm (48.5")	150 cm (59")	190 cm (75")
<b>Height (B)</b>	155 cm (61")	166.5 cm (65.5")	166.5 cm (65.5")
<b>Depth (C)</b>	140 cm (55")	230 cm (90.5")	230 cm (90.5")

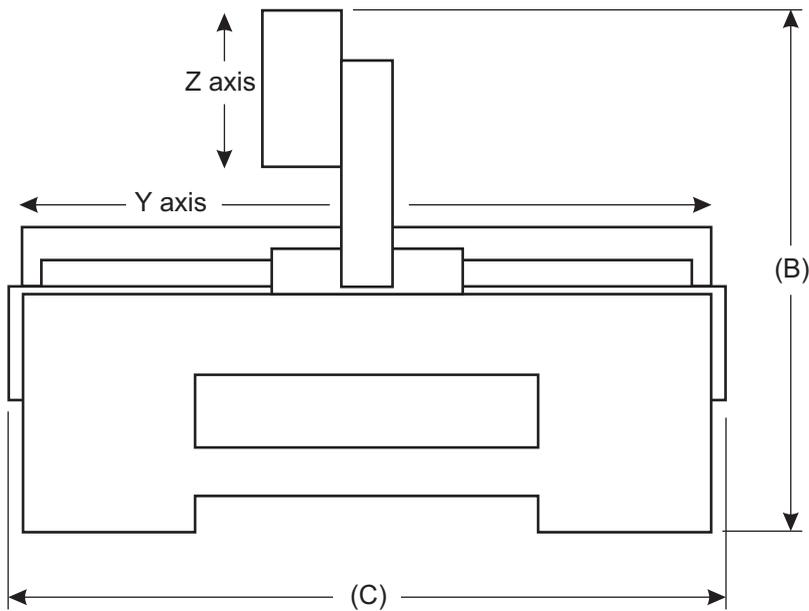
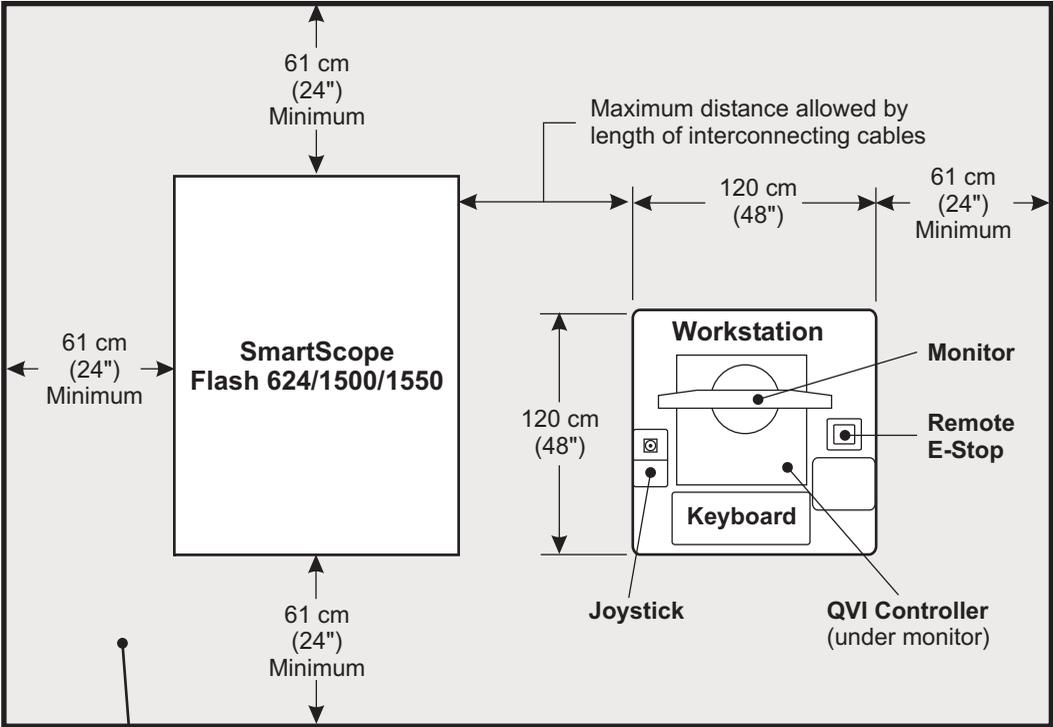


Figure 1-1. System Dimensions

For service access, we recommend the minimum space requirements shown in Figure 1-2 below.



Clearance area required for service access (shaded)

Figure 1-2. Clearance Area Required for Service Access

## Electrical Requirements

---

This subsection defines the following:

- Electrical supply cable requirements
- Power source circuit breakers

### Electrical Supply Cable Requirements

---

The system is supplied with an IEC power strip (P/N 037545), a power cable (P/N 019978) that connects the QVI Controller to the IEC power strip, and an external power cord that connects the IEC power strip to the external power source. External power cord characteristics vary depending on the country of installation, as defined in the table below.



**WARNING:** Always use the IEC power strip and external power cord that are supplied with the system. Use of an inappropriate power connection could lead to equipment damage and/or electrical shock.

---

Country	Power	OGP Power Cord Part Number	Type	AWG (US)	Wire Cross Section (CE)
• US	120 VAC, 50/60 Hz	019938	3-conductor	18	1.19 mm <sup>2</sup>
• Japan	100 VAC, 50 Hz	019938	3-Conductor	18	1.19 mm <sup>2</sup>
• UK	240 VAC, 50 Hz	019971	3-Conductor	18	1.19 mm <sup>2</sup>
• Italy	220 VAC, 50 Hz	019972	3-Conductor	18	1.19 mm <sup>2</sup>
• Denmark	220 VAC, 50 Hz	019974	3-Conductor	18	1.19 mm <sup>2</sup>
• Switzerland	220 VAC, 50 Hz	019975	3-Conductor	18	1.19 mm <sup>2</sup>
• Other European Countries	220 VAC, 50 Hz	019973	3-Conductor	18	1.19 mm <sup>2</sup>

## Power Source Circuit Breakers

Connect the system to dedicated electrical circuit. Observe the following precautions and guidelines when selecting/installing power source circuit breakers:

- Make sure the appropriate size and type of circuit breakers are selected, in compliance with the power requirements stated on the system.
- Current overload/circuit breaker protection must be selected and installed by a **qualified and fully licensed electrician**, in compliance with all national and local electrical codes in force in the country of installation.



**WARNING:** Installing inappropriate or inadequate current overload protection may cause equipment damage and/or personal injury.

## Fuse Requirements

The main power fuse is located in the fuse holder that is part of the QVI Controller On/Off switch and power cord receptacle assembly. There is a fuse label near the fuse location that indicates the type of fuse installed in the fuse cartridge.

- Systems configured for 100/120 volt operation, have **one** 10 Amp, 250 Volt, Slo Blo fuse (P/N 019459). A conversion clip is installed on the side of the fuse cartridge without the fuse.
- Systems configured for 220/240 volt operation, have **two** 6.3 Amp, 250 Volt, Slo Blo fuses (P/N 019463).



**CAUTION:** Always replace with fuses of the same type and amperage. Replacing with a different type or rating can damage electrical circuits and void your warranty. If your power source requirements ever change, you must change the fuse configuration accordingly.



**WARNING: Dangerous Voltage!** Always power down the system and disconnect the power cord before removing the fuse cartridge.

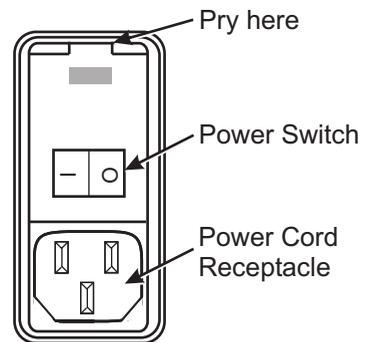


Figure 1-3. Replacing the Fuse

Pry open the fuse compartment door with a flat-head screwdriver and pull out the fuse cartridge (see Figure 1-3).

## Environmental Considerations

---

- Install the system in an environment where it is surrounded by fresh, clean air. The air should not contain airborne dust or other particulate matter, or oil mist. Airborne contaminants can adhere to the system electronics and optics, compromising its measurement accuracy.
- Keep the parts you are measuring, the system itself, and its immediate surroundings clean. This will prevent migration of contaminants to sensitive components.
- Eliminate or minimize any external vibration sources. Vibration transmitted to the system may compromise its measuring and/or repeatability.
- Do not operate the system in a medical, radioactive (nuclear), or explosive-atmosphere environment. See the Safety section for more detailed information.

This section covers the following:

- Removing the crating material
- Moving the machine to the final operating location
- Removing the shipping restraints
- Arranging and connecting the system
- Adjusting the read head spacing
- Checking the index pulse magnets
- Resetting the index pulses
- Installing the panels, covers, and bellows
- Installing the stage glass
- Powering up the system
- Verifying proper system operation

## Unpacking and Machine Placement

---

When you receive the system, the shipment will consist of the machine, disassembled workstation, computer equipment, stage glass, and accessories.

### Tools and Materials Required

---

- Forklift with 1.53 m (5') long forks, capable of lifting at least:
  - SmartScope Flash 624: 1,100 kg (2,450 lbs)
  - SmartScope Flash 1500: 2,950 kg (6,550 lbs)
  - SmartScope Flash 1550: 5,650 kg (12,500 lbs)
- Utility knife
- Pair of large diagonal cutters
- Set of Metric hex key (Allen) wrenches
- Set of English hex key (Allen) wrenches
- Phillips-head screwdriver
- 3/4-inch or adjustable wrench
- Bubble level

### Removing the Crating Material

---



**CAUTION:** Lift the shipment from the front, which is clearly labeled. Once the crating material is removed, lift the machine from the right side because that is where the maximum weight is centered.

---

**Note:** The specific packing of your system may vary from the following instructions. The following procedure provides general unpacking instructions.

---

**Note:** Before unpacking the machine be sure to review Section 1 for information about equipment dimensions, space requirements, and environmental considerations.

---

1. Remove the top of the shipping carton and remove the cardboard sleeve (*Domestic* orders) or disassemble the crate (*International* orders).
2. Drive a forklift to the front of the machine and move the machine (on the pallet) as close as possible to the final location where the system will be installed. **LIFT THE PALLET FROM THE FRONT OF THE MACHINE!**

3. Remove the external packing material from around the machine (see Figure 2-1).



**WARNING:** The metal band that secures the stage glass shipping container is under considerable tension and may recoil unpredictably when cut.

4. Using a pair of diagonal cutters, cut and remove the metal band used to secure the stage glass shipping container to the machine.
5. Using a 3/4-inch or adjustable wrench, remove the two bolts that secure the stage glass shipping container to the pallet (see Figure 2-1). Remove the container and set it aside.

Also remove the QVI Controller box, workstation pieces, accessory boxes, and the box containing the machine supports and mounting pads. Set everything aside. The number of boxes may vary, depending on the equipment ordered.

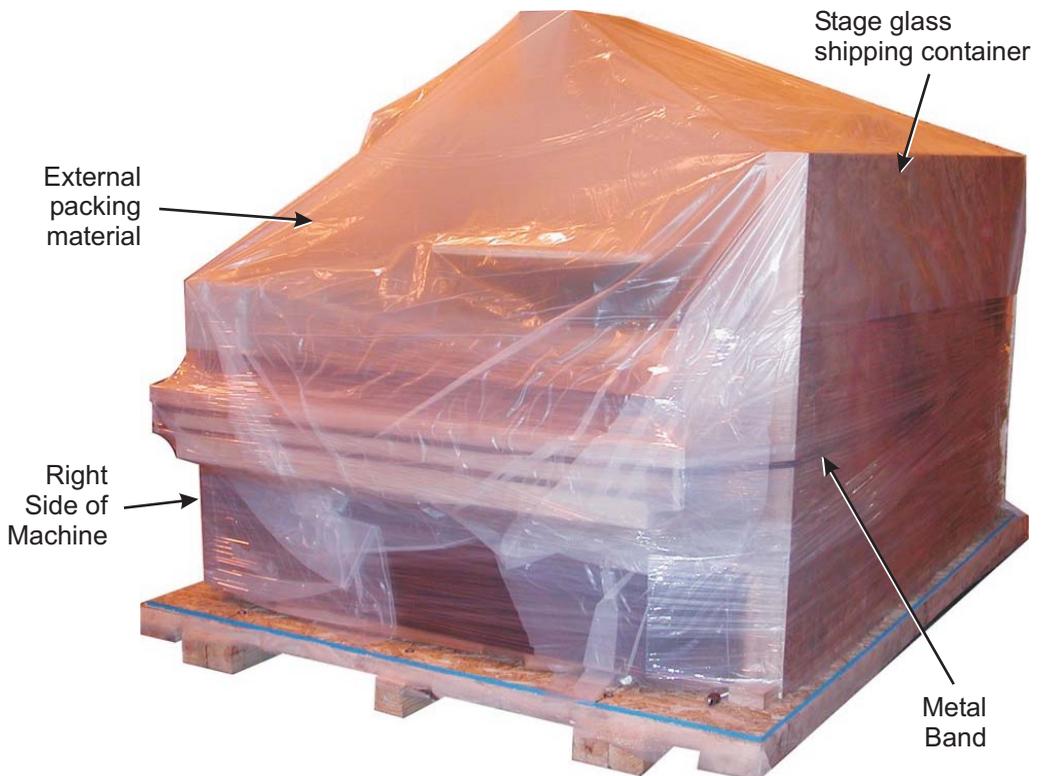


Figure 2-1. Removing the External Packing Material and Equipment

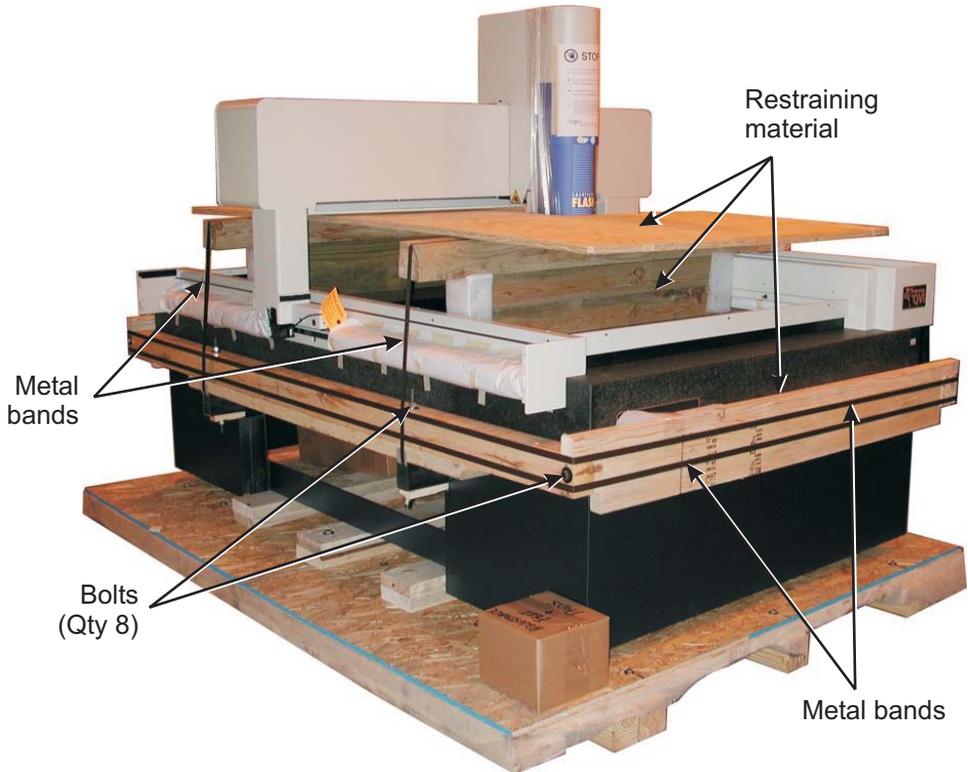


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**WARNING:** The metal bands that secure the granite to the frame are under considerable tension and may recoil unpredictably when cut.

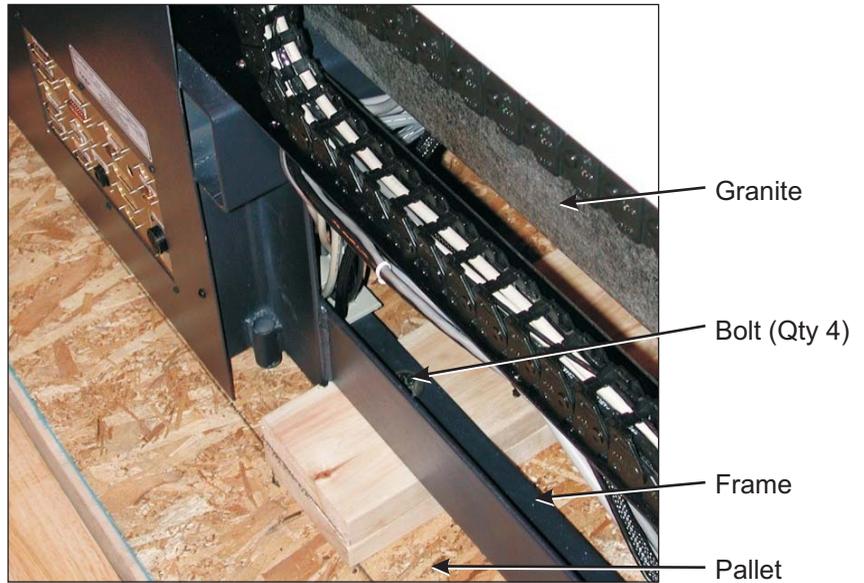
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6. Using a pair of diagonal cutters, cut and remove the metal bands used to secure the granite to the frame (see Figure 2-2).
7. Remove the remaining granite restraining material from the front, sides, and stage area by removing the bolts shown in Figure 2-2. Save the restraining material for possible future use. Use a 3/4-inch or adjustable wrench.



*Figure 2-2. Removing the Granite Restraining Material*

8. Remove any remaining packing material.
9. Using a 3/4-inch or adjustable wrench, remove the four bolts that secure the machine to the pallet (see Figure 2-3).



*Figure 2-3. Removing the Bolts that Secure the Machine to the Pallet*

## Moving the Machine to the Final Operating Location

---

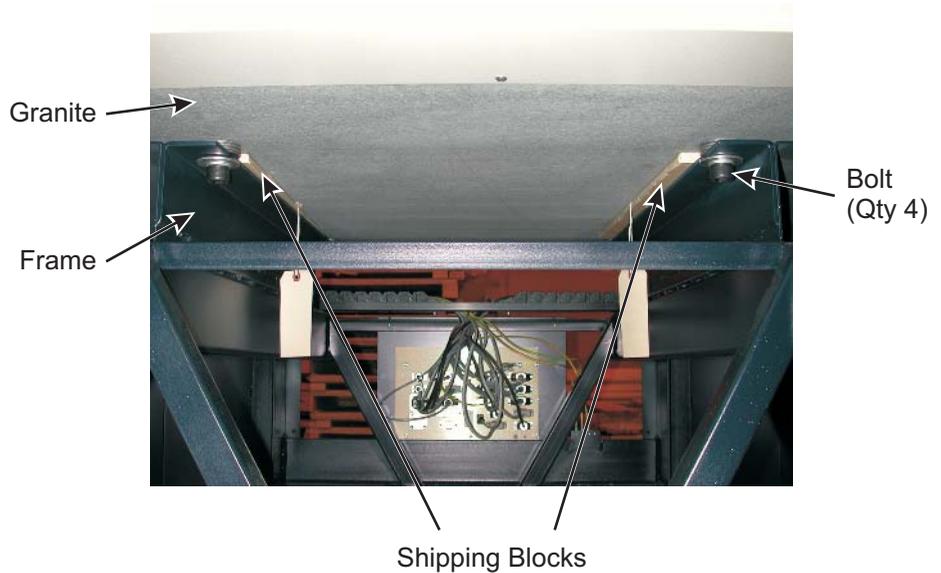
1. Drive a fork lift to the **RIGHT SIDE** of the machine and align the forks under the support rails on the bottom of the machine. Use cardboard to protect the machine from the forks.



*Figure 2-4. Lifting the Machine*

2. Slowly lift the machine straight up, off of the pallet.
3. Move the machine to the final operating location and slowly lower it to approximately 15 cm (6") above the floor.
4. Install the four machine supports and set the height of each support to 7.5 cm (3").
5. Place the four mounting pads under the machine supports and slowly lower the machine to the floor. Make sure the pads are properly aligned under the supports before lowering the machine completely.
6. Use a bubble level to determine if the machine is level in the X and Y directions. If necessary, lift the machine (from the right side), re-adjust the height of the machine supports, and slowly lower the machine. Repeat as many times as necessary until the top surface of the granite is level in the X and Y directions.

7. Slightly **loosen** (do not remove) the four bolts that secure the granite to the metal frame (see Figure 2-5). Then remove the two shipping blocks from between the granite and frame.



*Figure 2-5. Removing the Shipping Blocks*

8. Retighten the four bolts that secure the granite to the metal frame.

## Installation and Setup

After removing the crating material and moving the machine to the final operating location, do the following:

1. Remove the shipping restraints (and protective copper strips)
2. Connect the system
3. Adjust the X axis and Y axis read head spacing
4. Check the X axis and Y axis index pulse magnets
5. Reset the X axis and Y axis index pulses
6. Install the panels, covers, and bellows
7. Install the stage glass



**CAUTION:** Perform these setup procedures in the order presented within this section. If you set up the system in the wrong sequence, you could seriously damage the system.

## Tools and Materials Required

---

- Phillips-head screwdriver
- Set of Metric hex key (Allen) wrenches
- Set of English hex key (Allen) wrenches
- 00 Phillips-head jewelers screwdriver
- Read head spacer (provided)
- Four people (to install the stage glass)
- Four suction cup tools (recommended for installing the stage glass)
- Glass cleaner
- Soft, lint-free toweling

### 1. Removing the Shipping Restraints

---



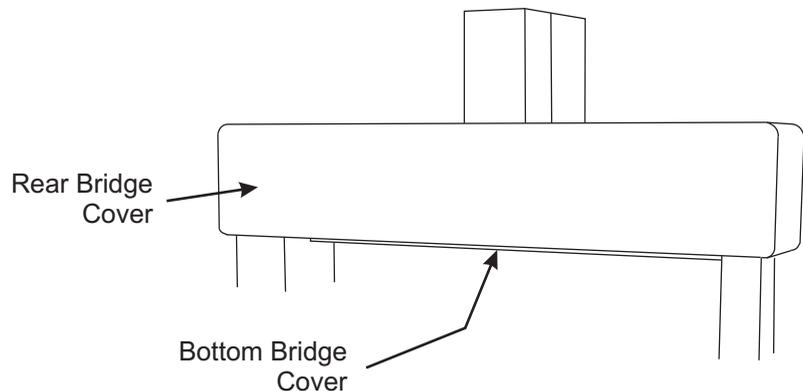
**CAUTION:** Do not attempt to operate the machine before removing the X, Y, and Z axis shipping restraints. Doing so could damage the machine.

---

**Note:** Do not discard the shipping restraints, shipping blocks, copper strips, or mounting hardware. You will need them if you want to relocate the machine after initial installation.

---

1. Remove the bottom bridge cover and rear bridge cover. Set the covers aside.



*Figure 2-6. Location Rear Bridge Cover and Bottom Bridge Cover*

2. From behind the X axis transport, remove the two X axis shipping screws (see Figure 2-7). Use a 5 mm Allen wrench. **DO NOT REMOVE THE SHIPPING BLOCKS UNTIL AFTER REMOVING THE COPPER STRIPS!**
3. Remove the two copper strips that protect the upper X axis rail.
4. Slightly lift the X axis transport in the locations identified in Figure 2-7 as you remove the two copper strips protecting the upper X axis rail. Then remove the two X axis shipping blocks and *gently* lower the X axis transport onto the rail.

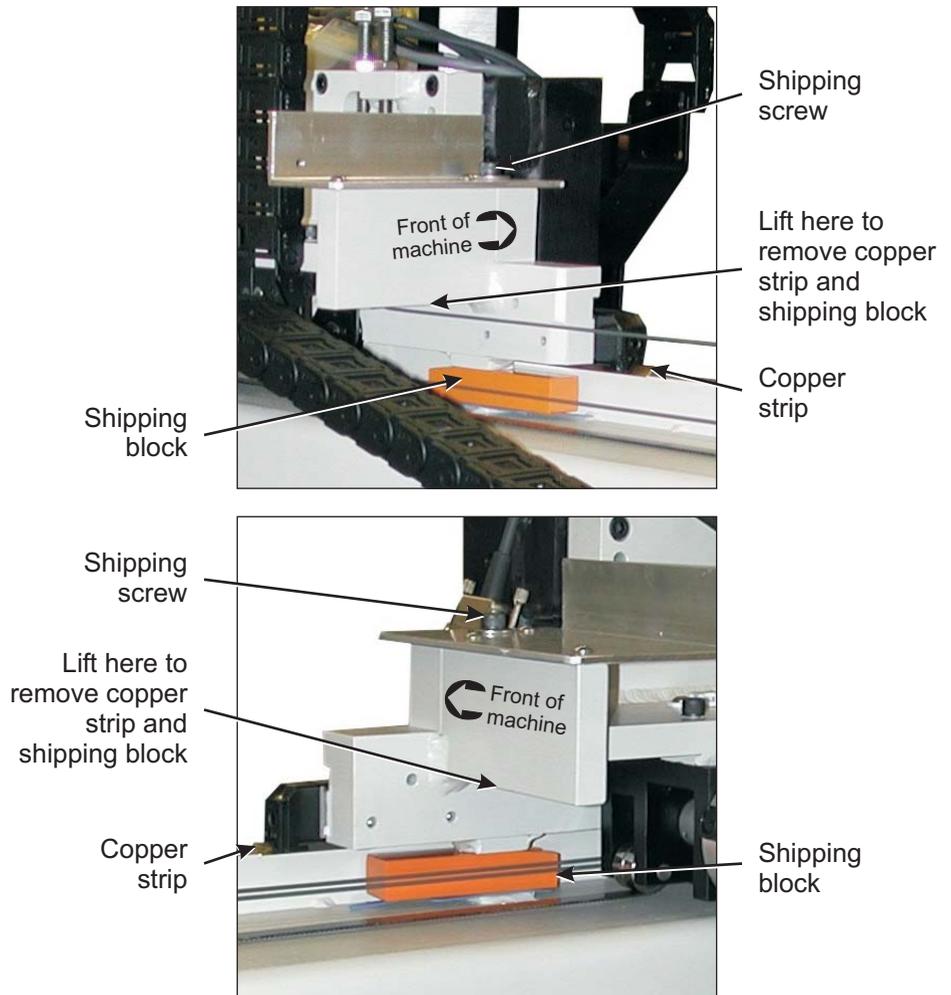


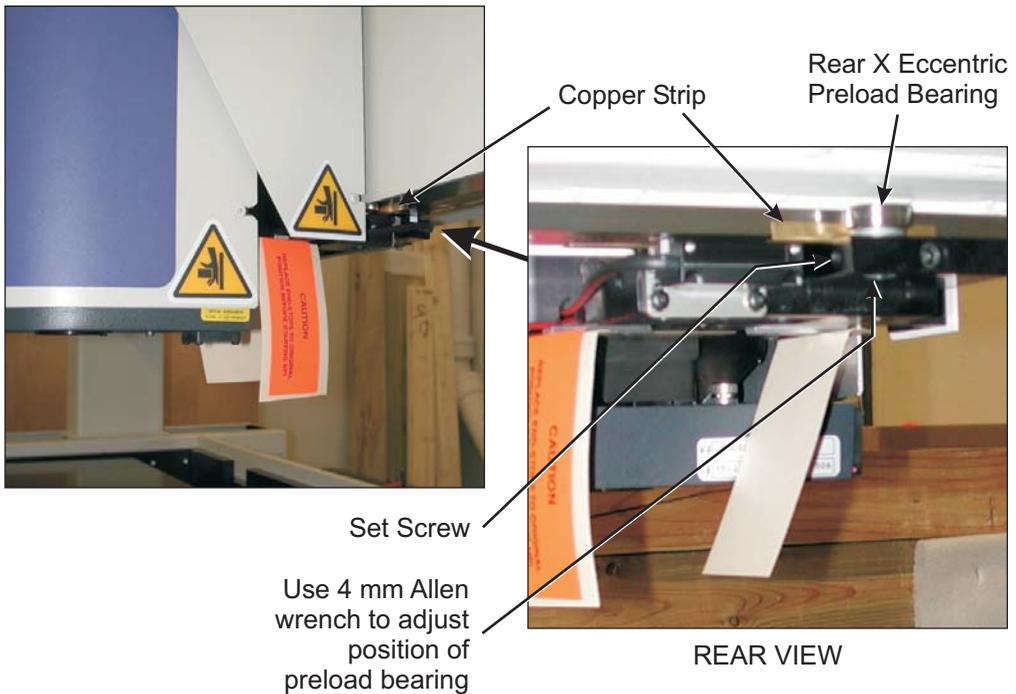
Figure 2-7. Removing the X Axis Copper Strips & Shipping Blocks

- Using a 3 mm Allen wrench, loosen the rear X eccentric preload bearing set screw (see Figure 2-8).
- Remove the copper strip between the rear X eccentric preload bearing and the lower X axis rail.



**CAUTION:** Do not overtighten the eccentric set screw. Doing so may cause premature failure of the eccentric preload bearing.

- Using a 4 mm Allen wrench, **ADJUST THE REAR X ECCENTRIC PRELOAD BEARING UNTIL IT IS FLUSH AGAINST THE LOWER X AXIS RAIL AND MEETS SLIGHT RESISTANCE WHEN TURNED BY HAND.** Re-tighten the eccentric set screw when finished.



*Figure 2-8. Removing the Copper Strips that Protect the Lower X Axis Rail*

- From the left side of the machine, remove the four screws that secure the shipping restraints to the front and back of the left column (see Figure 2-9). Use a 5 mm Allen wrench.

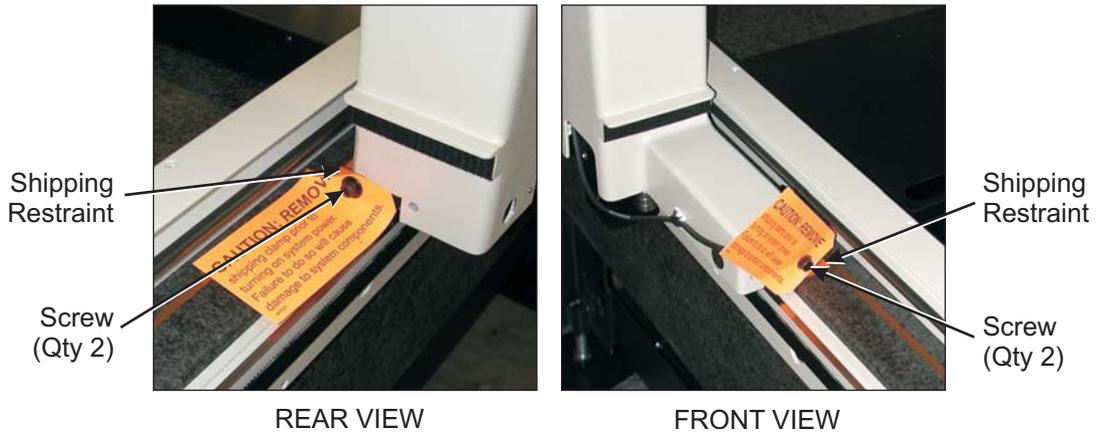


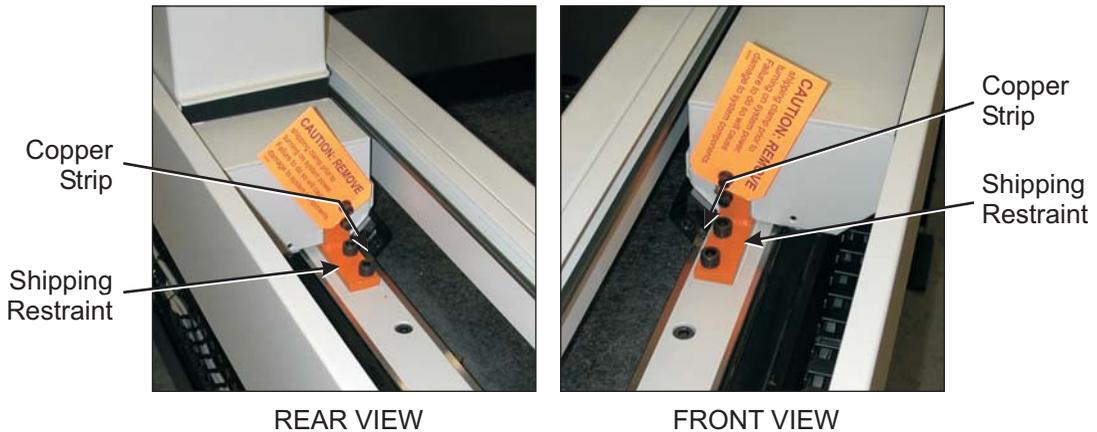
Figure 2-9. Removing the Y Axis Shipping Restraints on the Left Side of the Machine

- Lift the left column slightly, remove the shipping restraints, and then **gently** lower the column onto the left Y axis rail.
- Install the Y2 read head on the left side of the machine, as shown in Figure 2-9.



Figure 2-10. Installing the Y2 Read Head on the Left Side of the Machine

11. From the right side of the machine, remove the four screws that secure the shipping restraints to the front and back of the right column. Use a 5 mm Allen wrench and an 8 mm Allen wrench. **DO NOT REMOVE THE RESTRAINTS UNTIL AFTER REMOVING THE COPPER STRIPS!**
12. Remove the front and back copper strips that protect the Y axis rail on the right side of the machine (see Figure 2-10).
13. Have one person slightly lift the bridge transport from the right side of the machine as another person removes the front and back Y axis shipping restraints on the right side of the machine (see Figure 2-10). Then **gently** lower the transport onto the right Y axis rail.



*Figure 2-11. Removing the Y Axis Shipping Restraints on the Right Side of the Machine*

- Using a 3 mm Allen wrench, loosen the front and back Y eccentric preload bearing set screws (see Figure 2-11) on the right side of the machine.



**CAUTION:** Do not overtighten the eccentric set screws. Doing so may cause premature failure of the eccentric preload bearings.

- Using a 4 mm Allen wrench, **ADJUST THE FRONT AND BACK Y ECCENTRIC PRELOAD BEARINGS UNTIL EACH BEARING IS FLUSH AGAINST THE RIGHT Y AXIS RAIL AND MEETS SLIGHT RESISTANCE WHEN TURNED BY HAND.** Re-tighten the eccentric set screw when finished.

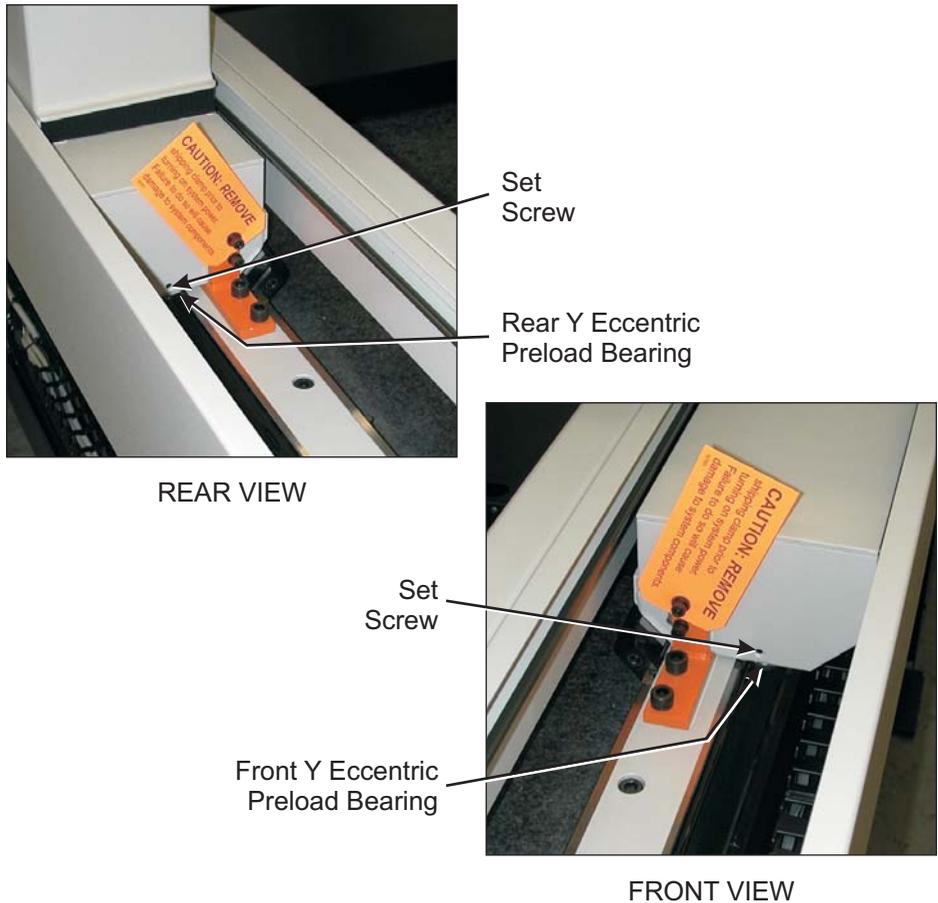
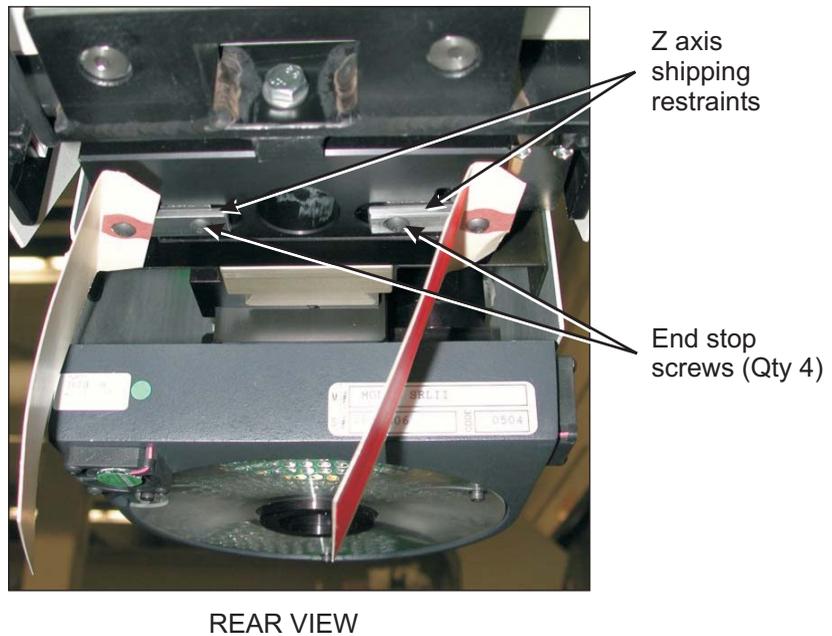


Figure 2-12. Adjusting the Front and Back Y Eccentric Preload Bearings

16. Locate the two Z axis shipping restraints attached to the bottom of the Z axis transport (see Figure 2-13).



*Figure 2-13. Removing the Z Axis Shipping Restraints*

17. Using a 2.5 mm Allen wrench, remove the four Z axis end stop screws and set them aside for use in the next step. Then, remove both Z axis shipping restraints. When you remove the shipping restraints you will reveal four end stops.



---

**CAUTION:** Do not discard the four end stops and do not operate the machine without the end stops installed. The end stops retain ball bearings in the Z axis ball slide assembly, and are essential to the operation of the Z axis transport. Each end stop is secured by one screw.

---

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**Note:** Do not discard the Z axis shipping restraint. You will need it to re-secure the Z axis transport if you relocate the machine after initial installation.

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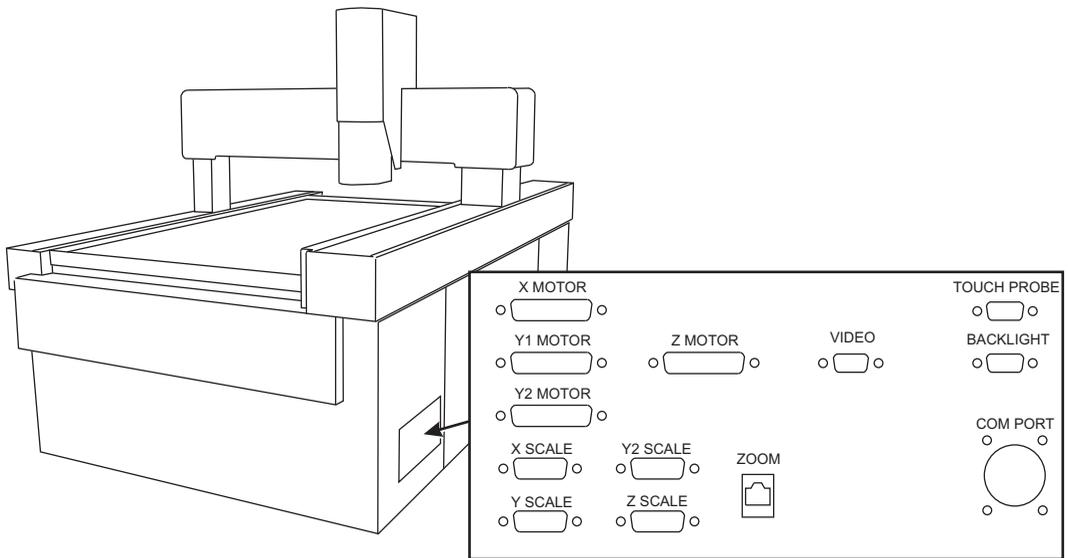
18. Using a 2.5 mm Allen wrench and the screws removed in the previous step, re-install the four Z axis end stops into their original positions.

## 2. Arranging and Connecting Major System Components



**CAUTION:** Do not perform the standard system power-up procedure until after adjusting the X axis and Y axis read heads, checking the X axis and Y axis index pulse magnets, resetting the X axis and Y axis index pulses, installing the covers, and installing the stage glass.

1. Unpack and assemble the workstation. Place it next to the machine, on the right side.
2. Unpack and unwrap all remaining system components and cables and place them in their respective areas on the workstation.
3. Use the cabling diagram on the next page and the table that starts on page 2-17 to connect the system. All cables are clearly marked regarding function, and where each connects.



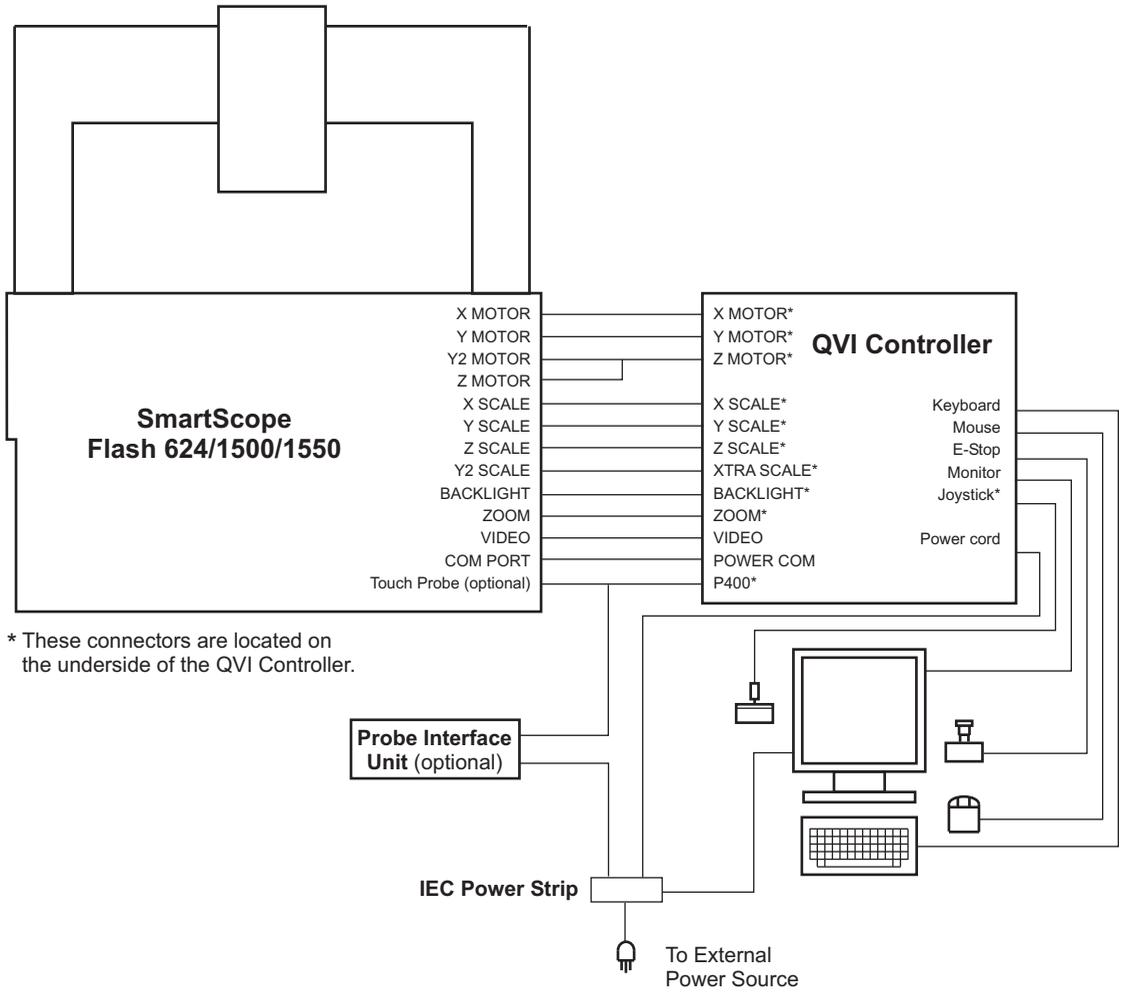


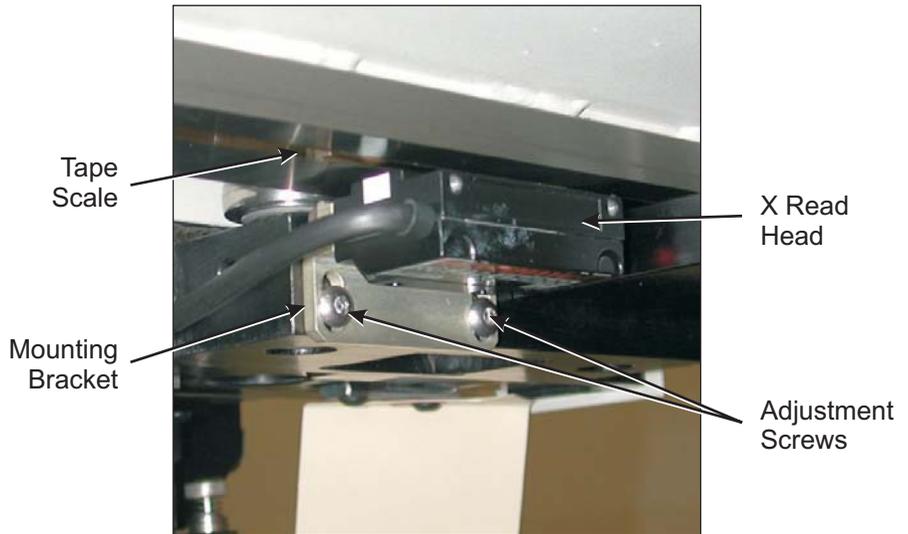
Figure 2-14. System Cabling Diagram

<b>Cable</b>	<b>From</b>	<b>To</b>	<b>OGP Part Number</b>
• X Motor	<b>X Motor</b> connector on machine	<b>X Motor</b> connector on QVI Controller	049084.08
• Y1 Motor	<b>Y Motor</b> connector on machine	<b>Y Motor</b> connector on QVI Controller	049084.09
• Y2 Motor, Z Motor	<b>Y2 Motor</b> connector on machine	<b>Z Motor</b> connector on QVI Controller	060507-1
	<b>Z Motor</b> connector on machine		
• X Scale	<b>X Scale</b> connector on machine	<b>X Scale</b> connector on QVI Controller	049024.01
• Y Scale	<b>Y Scale</b> connector on machine	<b>Y Scale</b> connector on QVI Controller	049024.08
• Z Scale	<b>Z Scale</b> connector on machine	<b>Z Scale</b> connector on QVI Controller	049024.02
• Extra Scale	<b>Y2 Scale</b> connector on machine	<b>XTRA Scale</b> connector on QVI Controller	049024.09
• Backlight	<b>Backlight</b> connector on machine	<b>Backlight</b> connector on QVI Controller	061288
• Zoom	<b>Zoom</b> connector on machine	<b>Zoom</b> connector on QVI Controller	039841
• Joystick	Joystick	<b>Joystick</b> connector on QVI Controller	021041
• DWI/VRL Power	<b>Com Port</b> connector on machine	<b>Power Com</b> connector on QVI Controller	061283
• Video	<b>Video</b> connector on machine	<b>Video</b> connector on QVI Controller	039742

<b>Cable</b>	<b>From</b>	<b>To</b>	<b>OGP Part Number</b>
• Mouse	Mouse	<b>Mouse</b> connector on QVI Controller	—
• Keyboard	Keyboard	<b>Keyboard</b> connector on QVI Controller	—
• Monitor	Monitor	<b>Monitor</b> connector on QVI Controller	included with monitor
• Remote E-Stop	Remote E-Stop	<b>E-Stop</b> connector on QVI Controller	039836
• Touch probe (optional)	Touch Probe connector on machine	<b>P400</b> connector on QVI Controller	—
		Probe Interface Unit	—
• Power cords	Power cord receptacle on monitor	IEC power strip	included with monitor
	Power cord receptacle on QVI Controller	IEC power strip	019978
	Power cord receptacle on PI200 box (if equipped)	IEC power strip	included with PI200 box
	IEC power strip	Main power source	see table in Section 1

### 3. Adjusting the X Axis and Y Axis Read Head Spacing

1. Power up the QVI Controller, **but do not launch the metrology software.**
2. Go to the back of the Z axis assembly and locate the X read head.
3. Using a 2.5 mm Allen wrench, loosen the two X read head adjustment screws (see Figure 2-14).



REAR VIEW

*Figure 2-15. Adjusting the X Read Head Spacing*



---

**CAUTION:** Avoid scratching the tape scale when using the spacer to adjust the read head spacing.

---

4. Insert the provided blue (or orange) read head spacer between the X read head and tape scale. Make sure the spacer is aligned to the center of the read head and the scale.
5. Adjust the position of the X read head so it is a spacer-thickness away from the scale.



---

**CAUTION:** Avoid scratching the tape scale when removing the spacer.

---

6. Tighten the adjustment screws to secure the X read head in position, and then carefully remove the spacer.

7. Manually move the X axis transport slowly along the full length of X travel while observing the lamp on the X read head.

The lamp should remain green over the entire travel, except when passing over the X index pulse magnet.

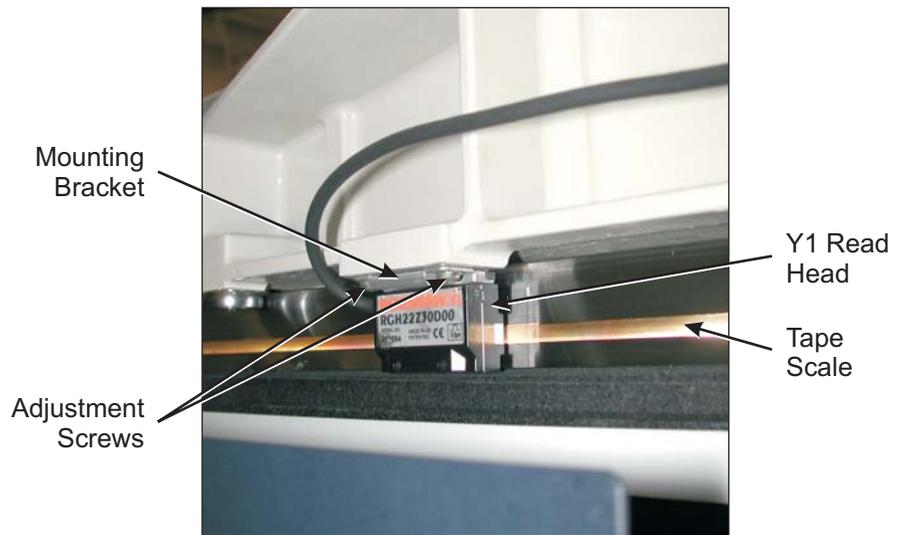
- If the lamp remains green over the entire travel, no adjustment to the X read head is necessary; go to Step 8.
- If the lamp illuminates yellow or red (even for a short period of time) when not over the index pulse magnet, repeat Steps 3 through 7 to re-adjust the read head spacing.

---

**Note:** The lamp may illuminate yellow or red if the read head is too close to the scale, too far away from the scale, or not parallel to the scale.

---

8. Go to the right side of the machine and locate the Y1 read head.
9. Using a 2.5 mm Allen wrench, loosen the two Y1 read head adjustment screws (see Figure 2-15).



*Figure 2-16. Adjusting the Y1 Read Head Spacing*



---

**CAUTION:** Avoid scratching the tape scale when using the spacer to adjust the read head spacing.

---

10. Insert the provided blue (or orange) read head spacer between the Y1 read head and tape scale. Make sure the spacer is aligned to the center of the read head and the scale.

11. Adjust the position of the Y1 read head so it is a spacer-thickness away from the scale.



---

**CAUTION:** Avoid scratching the tape scale when removing the spacer.

---

12. Tighten the adjustment screws to secure the read head in position, and then carefully remove the spacer.
13. Manually move the Y axis transport slowly along the full length of Y travel while observing the lamp on the Y1 read head.

The lamp should remain green over the entire travel, except when passing over the Y1 index pulse magnet.

- If the lamp remains green over the entire travel, no adjustment to the Y1 read head is necessary; go to Step 14.
- If the lamp illuminates yellow or red (even for a short period of time) when not over the index pulse magnet, repeat Steps 9 through 13 to re-adjust the read head spacing.

---

**Note:** The lamp may illuminate yellow or red if the read head is too close to the scale, too far away from the scale, or not parallel to the scale.

---

14. Go to the left side of the machine and locate the Y2 read head.
15. Using a 2.5 mm Allen wrench, loosen the two Y2 read head adjustment screws (see Figure 2-16).



*Figure 2-17. Adjusting the Y2 Read Head Spacing*



---

**CAUTION:** Avoid scratching the tape scale when using the spacer to adjust the read head spacing.

---

16. Insert the provided blue (or orange) read head spacer between the Y2 read head and tape scale. Make sure the spacer is aligned to the center of the read head and the scale.
17. Adjust the position of the Y2 read head so it is a spacer-thickness away from the scale.



---

**CAUTION:** Avoid scratching the tape scale when removing the spacer.

---

18. Tighten the adjustment screws to secure the read head in position, and then carefully remove the spacer.
19. Manually move the Y axis transport slowly along the full length of Y travel while observing the lamp on the Y2 read head.

The lamp should remain green over the entire travel, except when passing over the Y2 index pulse magnet.

- If the lamp remains green over the entire travel, no adjustment to the Y2 read head is necessary; go to Step 20.
- If the lamp illuminates yellow or red (even for a short period of time) when not over the index pulse magnet, repeat Steps 15 through 19 to re-adjust the read head spacing.

---

**Note:** The lamp may illuminate yellow or red if the read head is too close to the scale, too far away from the scale, or not parallel to the scale.

---

20. Check the X axis and Y axis index pulse magnets, as outlined in the next procedure.

## 4. Checking the X Axis and Y Axis Index Pulse Magnets

1. Locate the X index pulse magnet near the left limit of X travel (see Figure 2-17).



Figure 2-18. Location of the X Index Pulse Magnet

2. Manually move the X axis transport **slowly** in the **X+** direction until the X read head passes over the X index pulse magnet.

The lamp on the X read head should flash red when the read head passes over the X index pulse magnet.

- If the lamp flashes red, no adjustment to the X index pulse magnet is required; go to Step 6.
- If the lamp does not flash red (for example, it may flash orange or another dark color), continue with the next step to make the required adjustment.



---

**CAUTION:** Do not overtighten the index pulse magnet adjustment screw.

---

---

**CAUTION:** Be sure to insert the screwdriver properly into the index pulse adjustment screw to avoid separating the magnet from the spar.

---

3. Using a 00 Phillips-head jewelers screwdriver, turn the index pulse magnet adjustment screw fully clockwise (CW). **DO NOT OVERTIGHTEN!**
4. Turn the index pulse magnet adjustment screw a few degrees counterclockwise (CCW). Then repeat Step 2 to re-check the X index pulse magnet setting.

5. Repeat Steps 2 and 4 until the lamp on the X read head flashes red when the read head passes over the X index pulse magnet.
6. Go to the right side of the machine and locate the Y1 index pulse magnet near the front limit of Y travel (see Figure 2-18).

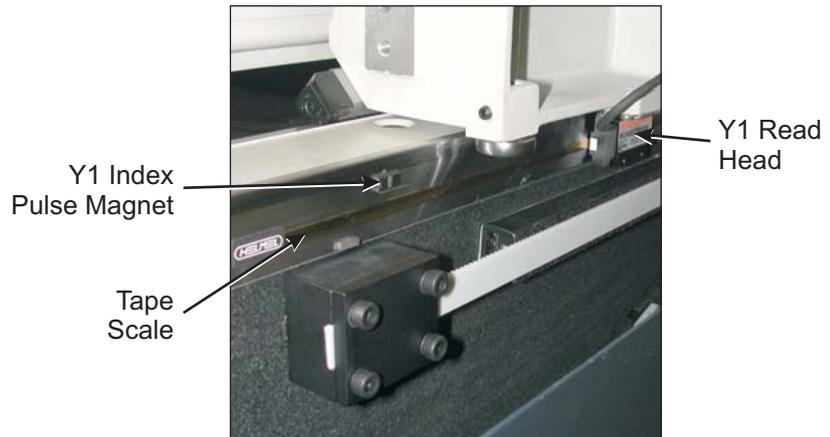


Figure 2-19. Location of the Y1 Index Pulse Magnet

7. Manually move the Y axis transport **slowly** in the **Y+** direction until the Y1 read head passes over the Y1 index pulse magnet.

The lamp on the Y1 read head should flash red when the read head passes over the Y1 index pulse magnet.

- If the lamp flashes red, no adjustment to the Y1 index pulse magnet is required; go to Step 13.
- If the lamp does not flash red (for example, it may flash orange or another dark color), continue with the next step to make the required adjustment.




---

**CAUTION:** Do not overtighten the index pulse magnet adjustment screw.

---



---

**CAUTION:** Be sure to insert the screwdriver properly into the index pulse adjustment screw to avoid separating the magnet from the spar.

---

8. Using a 00 Phillips-head jewelers screwdriver, turn the index pulse magnet adjustment screw fully clockwise (CW). **DO NOT OVERTIGHTEN!**
9. Turn the index pulse magnet adjustment screw a few degrees counterclockwise (CCW). Then repeat Step 7 to re-check the Y1 index pulse magnet setting.
10. Repeat Steps 7 and 9 until the lamp on the Y1 read head flashes red when the read head passes over the Y1 index pulse magnet.

11. Go to the left side of the machine and locate the Y2 index pulse magnet near the front limit of Y travel (see Figure 2-19).

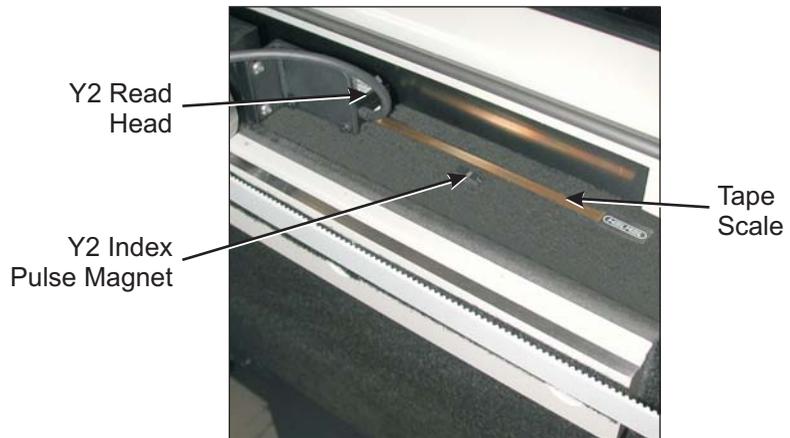


Figure 2-20. Location of the Y2 Index Pulse Magnet

12. Manually move the Y axis transport **slowly** in the **Y+** direction until the Y2 read head passes over the Y2 index pulse magnet.

The lamp on the Y2 read head should flash red when the read head passes over the Y2 index pulse magnet.

- If the lamp flashes red, no adjustment to the Y2 index pulse magnet is required; go to Step 16.
- If the lamp does not flash red (for example, it may flash orange or another dark color), continue with the next step to make the required adjustment.



---

**CAUTION:** Do not overtighten the index pulse magnet adjustment screw.

---



---

**CAUTION:** Be sure to insert the screwdriver properly into the index pulse adjustment screw to avoid separating the magnet from the spar.

---

13. Using a 00 Phillips-head jewelers screwdriver, turn the index pulse magnet adjustment screw fully clockwise (CW). **DO NOT OVERTIGHTEN!**
14. Turn the index pulse magnet adjustment screw a few degrees counterclockwise (CCW). Then repeat Step 12 to re-check the Y2 index pulse magnet setting.
15. Repeat Steps 12 and 14 until the lamp on the Y2 read head flashes red when the read head passes over the Y2 index pulse magnet.
16. Reset the X axis and Y axis index pulses, as outlined in the next procedure.

## 5. Resetting the X Axis and Y Axis Index Pulses

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### Systems Equipped with Measure-X Software

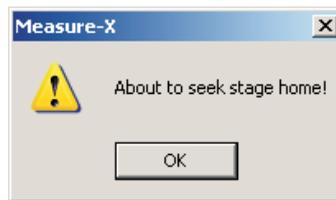
1. Insert the system Options Disk into the system disk drive.
2. Launch the Measure-X software by double-clicking its Desktop icon.

The software loads and the following appears:



3. Press the **Stop/Start** button on the QVI Controller.

The following appears:



4. Press the **Stop/Start** button on the QVI Controller to put the system in Stop Mode.
5. Click **OK**.

The following appears:



6. Press the **Stop/Start** button on the QVI Controller, and then click **OK**.

The system initializes the zoom lens and performs an AccuCentric calibration; it does not initialize the stages.

7. Select **System / Configuration** ⇒ **Editor** in the Measure-X main menu.
8. Go to the **Stage** section and set the following parameters:
  - USE\_INDEX\_PULSE **1**
  - X\_INDEX\_OFFSET **0.0**
  - Y\_INDEX\_OFFSET **0.0**
  - Z\_INDEX\_OFFSET **0.0**
  - SECOND\_X\_INDEX\_OFFSET **0.0**
  - SECOND\_Y\_INDEX\_OFFSET **0.0**
  - SECOND\_Z\_INDEX\_OFFSET **0.0**
  - DUAL\_DRIVE\_INDEX\_DELTA **0**
9. Got to the **Servos** section and set the following parameter:
  - AG\_DUAL\_DRIVE\_SERVO **1**
10. Click **Save All**, and then click **Close**.
11. Using the joystick, drive the X, Y, and Z axis transports to the center of travel.
12. Reboot the Measure-X software.

If a missed index pulse error message appears, perform the *Checking the X Axis and Y Axis Index Pulse Magnets* procedure on page 2-23 Then perform this procedure again to reset the X axis and Y axis index pulses.
13. Reboot the Measure-X software and verify that the system successfully initializes the stages.
14. Perform the Non-linear grid calibration outlined in the *Calibration and Alignment Manual* for your system.

## Systems Equipped with MeasureMind 3D Software

1. Insert the system Options Disk into the system disk drive.
2. Launch the MeasureMind 3D software by double-clicking its Desktop icon.

The software loads and following appears:

Press the 'STOP/START' button to continue ...

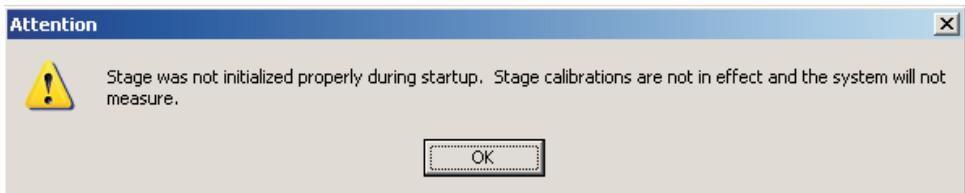
3. Press the **Stop/Start** button on the QVI Controller.

The following appears:



4. Press the **Stop/Start** button on the QVI Controller to put the system in Stop Mode.
5. Click **OK**.

The following appears:



6. Press the **Stop/Start** button on the QVI Controller, and then click **OK**.

The system initializes the zoom lens and performs an AccuCentric calibration; it does not initialize the stages.

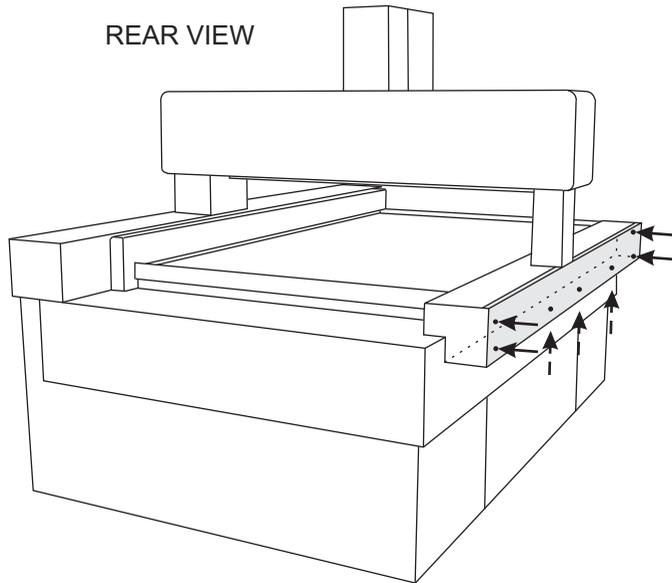
7. Press **F8** and open the HARDWARE.CFG file.
8. Set the following parameters:
  - DATA USE\_INDEX\_PULSE **1**
  - DATA X\_INDEX\_OFFSET **0.0**
  - DATA Y\_INDEX\_OFFSET **0.0**
  - DATA Z\_INDEX\_OFFSET **0.0**
  - DATA SECOND\_X\_INDEX\_OFFSET **0.0**
  - DATA SECOND\_Y\_INDEX\_OFFSET **0.0**
  - DATA SECOND\_Z\_INDEX\_OFFSET **0.0**
  - DATA DUAL\_DRIVE\_INDEX\_DELTA **0.0**
  - SERVOS AG\_DUAL\_DRIVE\_SERVO **1**
9. Save and close the HARDWARE.CFG file.
10. Using the joystick, drive the X, Y, and Z axis transports to the center of travel.
11. Reboot the MeasureMind 3D software.

If a missed index pulse error message appears, perform the *Checking the X Axis and Y Axis Index Pulse Magnets* procedure on page 2-23. Then perform this procedure again to reset the X axis and Y axis index pulses.
12. Reboot the MeasureMind 3D software and verify that the system successfully initializes the stages.
13. Perform the Non-linear grid calibration outlined in the *Calibration and Alignment Manual* for your system.

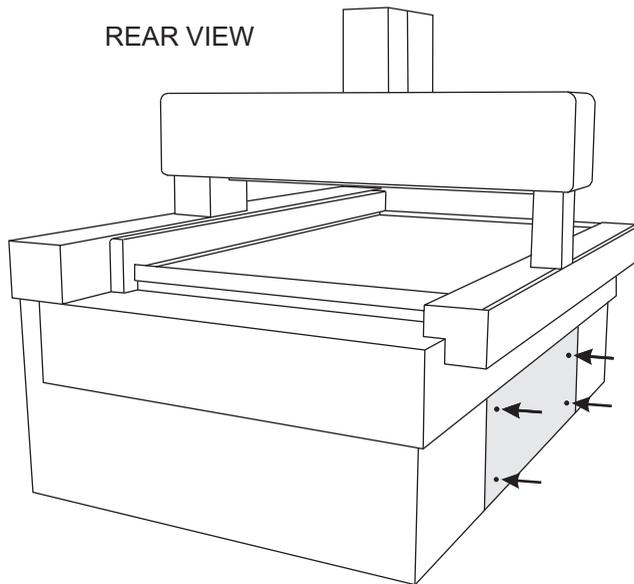
## 6. Installing the Panels, Covers, and Bellows

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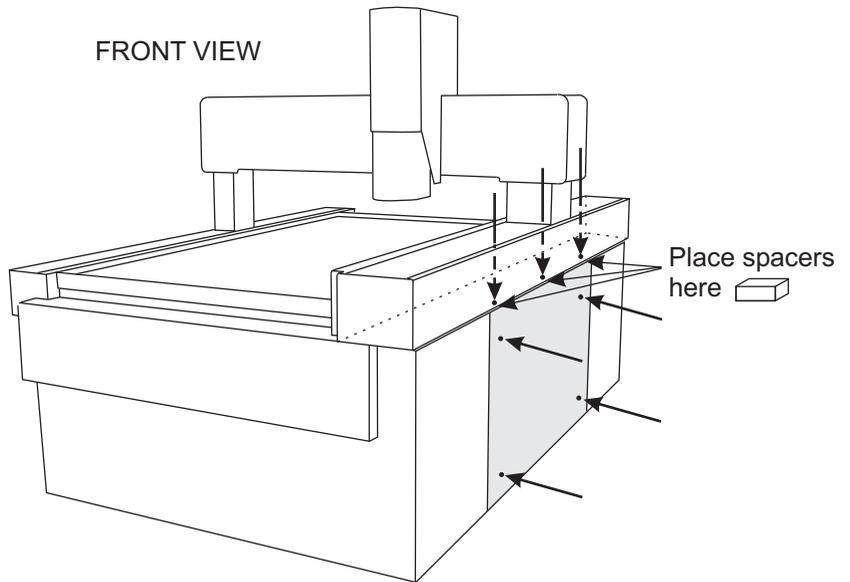
1. Using a 3 mm Allen wrench, install the left rail cover. Note that three of the screws are located on the underside of the cover.



2. Using a 3 mm Allen wrench, install the left panel.



- Using a 3 mm Allen wrench, install the right panel. Place the three black, square spacers (provided) between the top of the panel and the bottom of the right rail cover before installing the top three screws.



- Install the bellows over the left and right Y axis rails and the left and right X axis rails. Use the velcro strips to fasten the bellows in place properly.

## 7. Installing the Stage Glass

---



**CAUTION:** The stage glass is extremely heavy and requires at least four people to install it. We recommend using four suction cup tools, one for each corner, to lift the stage glass.

---



**CAUTION:** The stage glass is fragile and should be handled with care. Also, whenever handling the stage glass, make sure your hands are clean and do not place the glass on a dirty surface.

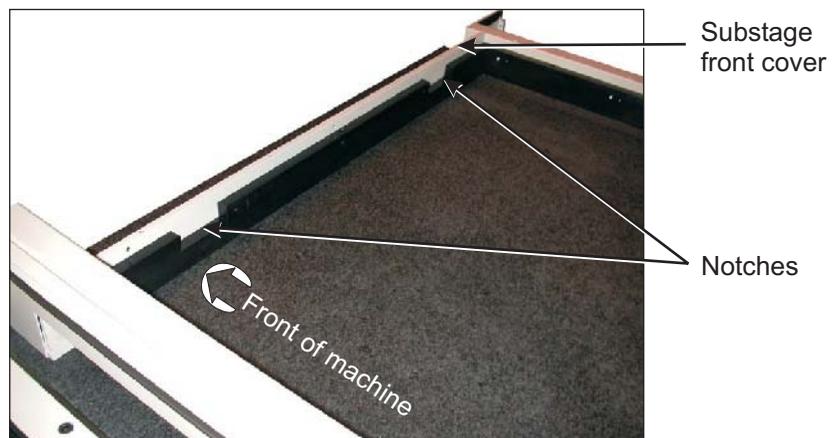
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1. Locate the stage glass shipping container and lay it flat on a cart capable of supporting approximately 140 kg (300 lbs). Make sure the screws that secure the front cover of the container are accessible.
2. Move the cart as close as possible to the machine, steadying the shipping container at all times.
3. Using a Phillips head-screwdriver, remove the front cover.
4. Remove the foam and bubble wrap from around the stage glass, and then clean the stage glass with glass cleaner and soft, lint-free toweling.
5. Using four suction cup tools (place one in each corner of the stage glass) and four people, lift the stage glass straight up to remove it from the shipping container, and then carefully set it on the recessed ledge in the stage opening.

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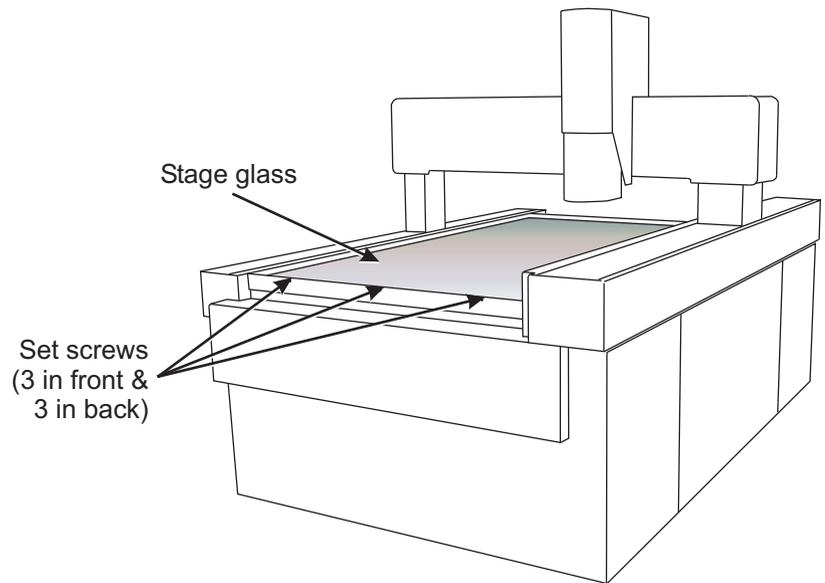
**Note:** If four suction cup tools are unavailable, you can lift the stage glass by hand. Remove the front and back substage covers to reveal notches in the substage frame for your hands (see Figure 2-21).

---



*Figure 2-21. Notches in the Substage Frame*

- Using a 3 mm Allen wrench, tighten the six set screws (three in front and three in back) that secure the stage glass in place. **DO NOT OVERTIGHTEN THE SET SCREWS OR APPLY EXCESSIVE FORCE TO THE GLASS!**



## Standard System Power-Up Procedure

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Before you start, verify the following:

- All shipping restraints have been removed
- All system components are connected and ready to receive power
- The X axis and Y axis read head spacing is correct
- The X axis and Y axis index pulse magnets have been checked (and adjusted if necessary)
- The X axis and Y axis index pulses have been reset
- All covers and panels are installed
- The stage glass is installed

The monitor and QVI Controller power switches should be in the OFF position. If the system is equipped with a touch probe, the PI200 box power switch should be in the ON position.

To power up the system, follow the appropriate flow chart. Each chart describes your actions along with system messages, prompts, and dialog boxes.

- Refer to Figure 2-21 on the next page if the system is equipped with the Measure-X metrology software.
- Refer to Figure 2-23 on page 2-37 if the system is equipped with the MeasureMind 3D metrology software.

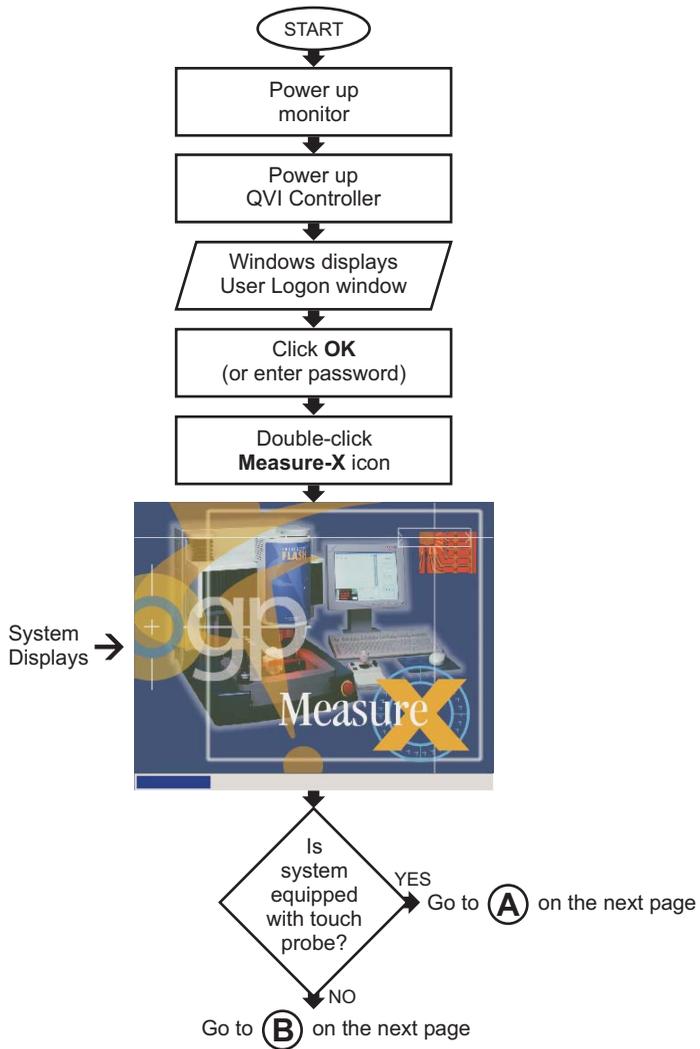


Figure 2-22. Normal Power-Up Sequence (Measure-X Systems) - Sheet 1 of 2

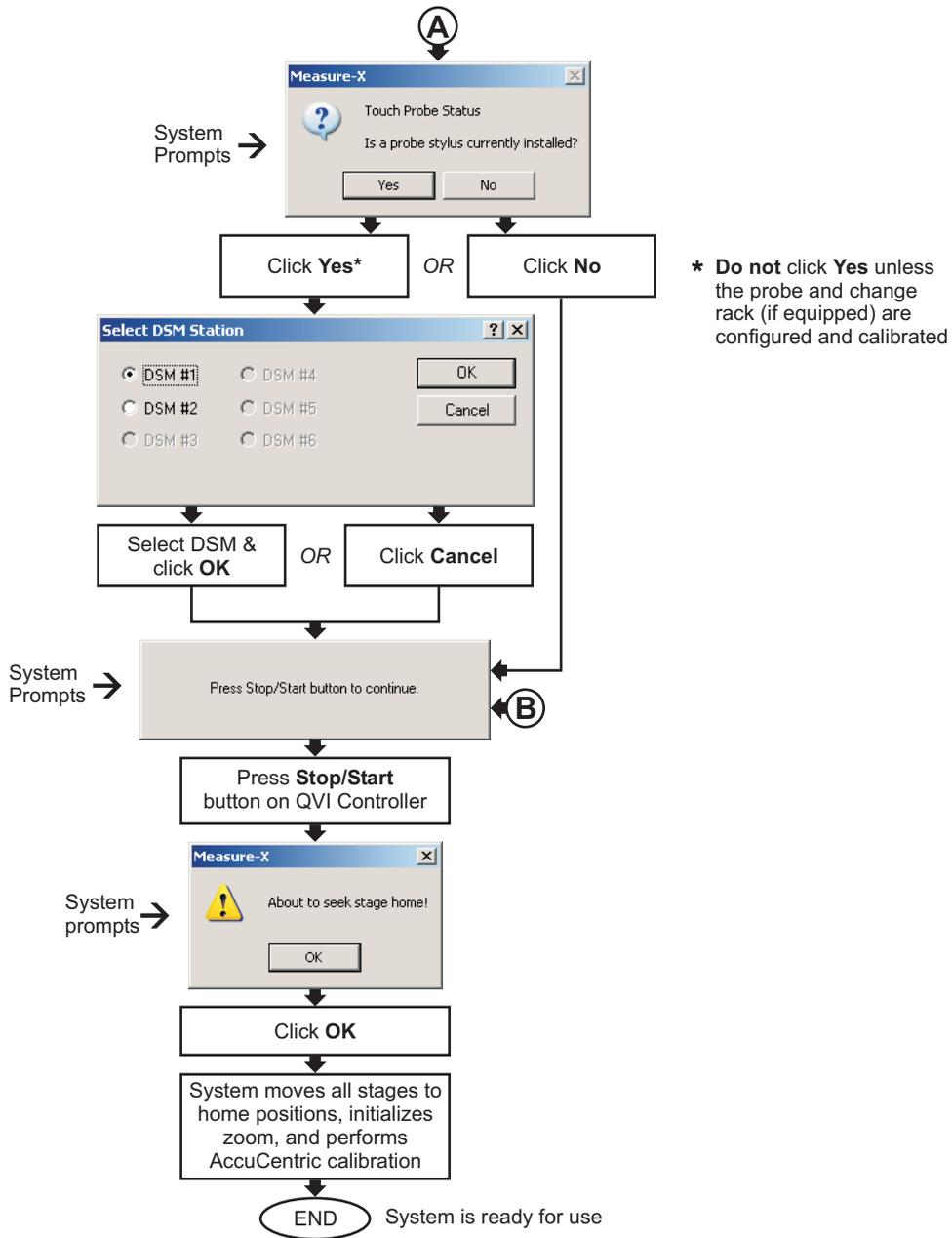


Figure 2-23. Normal Power-Up Sequence (Measure-X Systems) - Sheet 2 of 2

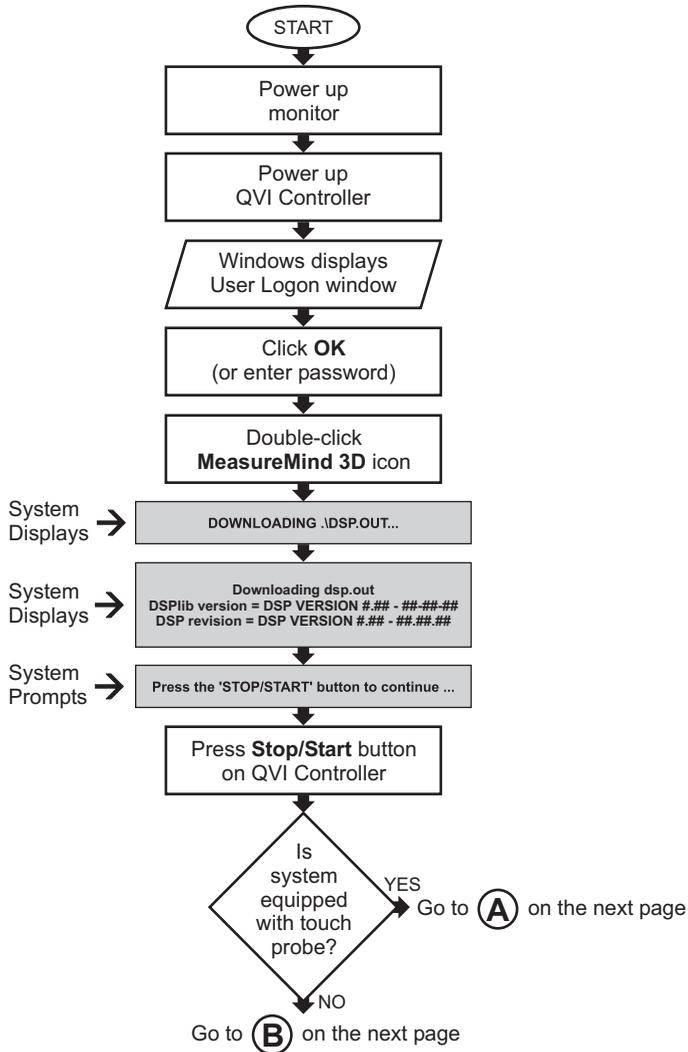


Figure 2-24. Normal Power-Up Sequence (MeasureMind 3D Systems) - Sheet 1 of 2

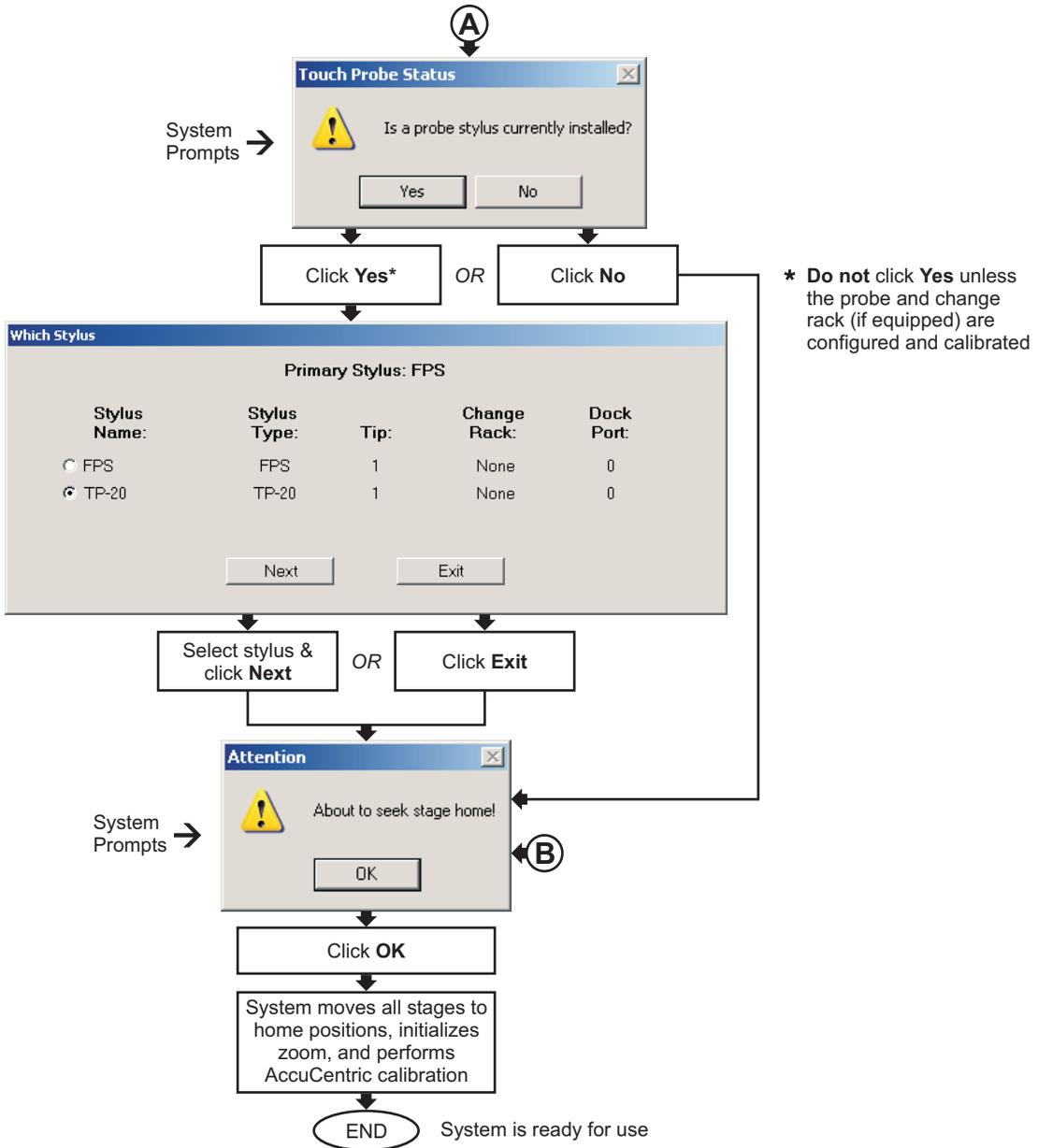


Figure 2-25. Normal Power-Up Sequence (MeasureMind 3D Systems) - Sheet 2 of 2

## Operation Checks

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After powering up the system, you should verify that the system performs as expected. If the system fails any of the following operation checks, contact your local authorized OGP Representative immediately.



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**CAUTION:** Before performing any of the following operation checks, verify that no parts, fixtures, or other obstructions are on the worktable.

---

1. Press the **Stop/Start** button on the QVI Controller front panel to put the system in Stop mode and to remove power from all motors. The yellow Stop LED on the front of the Z axis cover will illuminate and the XYZ transports will not move when the joystick is deflected.

If the system does not respond as expected, power down the system and contact your local authorized OGP Representative.

If the system appears to be functioning properly, press the **Stop/Start** button again to resume normal operation.

2. Press the remote E-Stop to put the system in E-Stop mode and to remove power from all motors. The yellow Stop LED on the front of the Z axis cover will blink rapidly and the XYZ transports will not move when the joystick is deflected.

If the system does not respond as expected, verify that the remote E-Stop cable is properly connected to the back of the QVI Controller.

If the system appears to be functioning properly, reset the E-Stop by twisting the knob in the direction of the arrows. Then press the **Stop/Start** button to resume normal operation.

3. Use the illumination knobs on the QVI Controller to adjust the light levels from 0% to 100%. The intensity of each selected light should change as expected.

If the system does not respond as expected, verify that the backlight and DWI/VRL power cables are properly connected to the QVI Controller.

4. Twist the joystick knob to change the Z axis position. Movement should be smooth, the Z axis readout in the DRO window should change as expected, and the system will automatically stop when the Z axis slide reaches its end-of-travel.

If the system does not perform as expected, verify that the Z axis motor, Z axis scale, and joystick cables are properly connected to the underside of the QVI Controller.

5. Deflect the joystick left and right to change the X axis position. Movement should be smooth, the X axis readout in the DRO window should change as expected, and the system will automatically stop when it reaches its end-of-travel.

If the system does not perform as expected, verify that the X axis motor, X axis scale, and joystick cables are properly connected to the QVI Controller.

6. Deflect the joystick toward and away from you to change the Y axis position. Movement should be smooth, the Y axis readout in the DRO window should change as expected, and the system will automatically stop when it reaches its end-of-travel.

If the system does not perform as expected, verify that the Y axis motor, Y axis scale, and joystick cables are properly connected to the QVI Controller.

The system will not perform properly unless it passes all of the above operation checks. Contact your local authorized OGP Representative immediately if the system fails any of these operation checks.

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