VIEW Engineering, Inc.

Benchmark™ 450
Installation Manual

VIEW™
VIEW Engineering, Inc.
A Quality Vision International Company

VIEW Engineering, Inc.

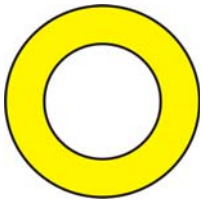
Benchmark™ 450
Installation Manual

Part No. 799034, Revision A, 10/08

Benchmark equipment is made in the U.S.A.

Table of Contents

Important System Labels

Label:	Location:	Definition:
	Around the remote E-Stop Around the E-Stop on the front of the machine	(Yellow ring around red switch) Emergency stop
	Left and right sides of the Front Cover	Pinch hazard
	Rear panel of the electronics enclosure, lower-left corner	Dangerous voltage present; disconnect power before servicing to avoid electrical shock
	Right side of the electronics enclosure, above the power cord receptacle	Fuse label
	Lower-left corner of Main System ID label	System meets the requirements of the European Union (EU)

Label:	Location:	Definition:
	Front surface of the base, upper-right corner	System model and serial number
	Rear panel of the electronics enclosure, lower-left corner	Main system ID
	Right side of the laser (if equipped)	International laser symbol
	Right side of the laser (if equipped)	Indicates that the laser meets Class 2 requirements of the IEC-825 European standard
	Right side of the laser (if equipped)	Indicates that the laser meets Class II requirements of the CFR 21 standard
	Right side of the laser (if equipped)	Identifies the laser emitting aperture

About This Manual

Chapter 1

1.1 What This Chapter Contains

This chapter covers the following:

- Who should read this manual
- What knowledge you must possess in order to use this manual
- What this manual contains
- Where to get help

1.2 Who Should Read This Manual

Read this manual if you will perform any of the following tasks on the Benchmark 450 system:

- Unpacking
- Installation
- Power up
- Shut down
- Operation

For information about using the metrology software, refer to the *VMS Fast Start Guide* (P/N 790438) or *VMS Reference Guide* (P/N 790411).

1.3 Required Knowledge

To use this manual, you should be familiar with:

- Fundamental computing concepts
- Non-contact measurement concepts

1.4 What's In this Manual?

This manual will help you unpack, install, set up, and power up the Benchmark 450 video metrology system. Important safety information is also included.

1.5 Where to Get Help

If you need help, contact the Customer Support HelpDesk, at:

VIEW Engineering, Inc.
1650 N. Voyager Avenue
Simi Valley, CA 93063, USA

Phone:	805-578-5000 Toll free: 877-SOS-VIEW (877-767-8439)
Fax:	805-578-5092
E-mail:	viewsupport@vieweng.com
Website:	www.vieweng.com

Be ready to provide the following information when contacting us:

- Model and serial number of your system
- Nature of the problem
- Steps you have taken
- Your phone and fax numbers
- Case number if you are calling about an issue that has already been reported

System Overview

Chapter 2

2.1 What This Chapter Contains

This chapter covers the following:

- What Is the Benchmark 450 System?
- System Components
- How the System Operates

2.2 What Is the Benchmark 450 System?

The Benchmark 450 is a high-accuracy, non-contact, dimensional measurement system. In Quality Assurance applications, Benchmark 450 moves dimensional inspection out of the lab and onto the production floor. Benchmark 450 is fully automatic and can run part inspection programs, collect data, print results, and send the results to a Statistical Process Control (SPC) program without any manual intervention.

Based on the Windows® XP operating system, the Benchmark 450 system comes with the VMS metrology software, which provides an easy-to-use graphical user interface and a full range of dimensional measurement tools.

The Benchmark 450 system has precision dual magnification optics, co-axial and backlight illumination, and patented autofocus circuitry for high-accuracy Z-axis measurements over a variety of surface textures, finishes, and colors. The patented LED Programmable Ring Light (PRL) is optional.

Note: See the *VIEW Benchmark 450 Technical Data Sheet* (part number 799003) for more technical information.

2.3 System Components

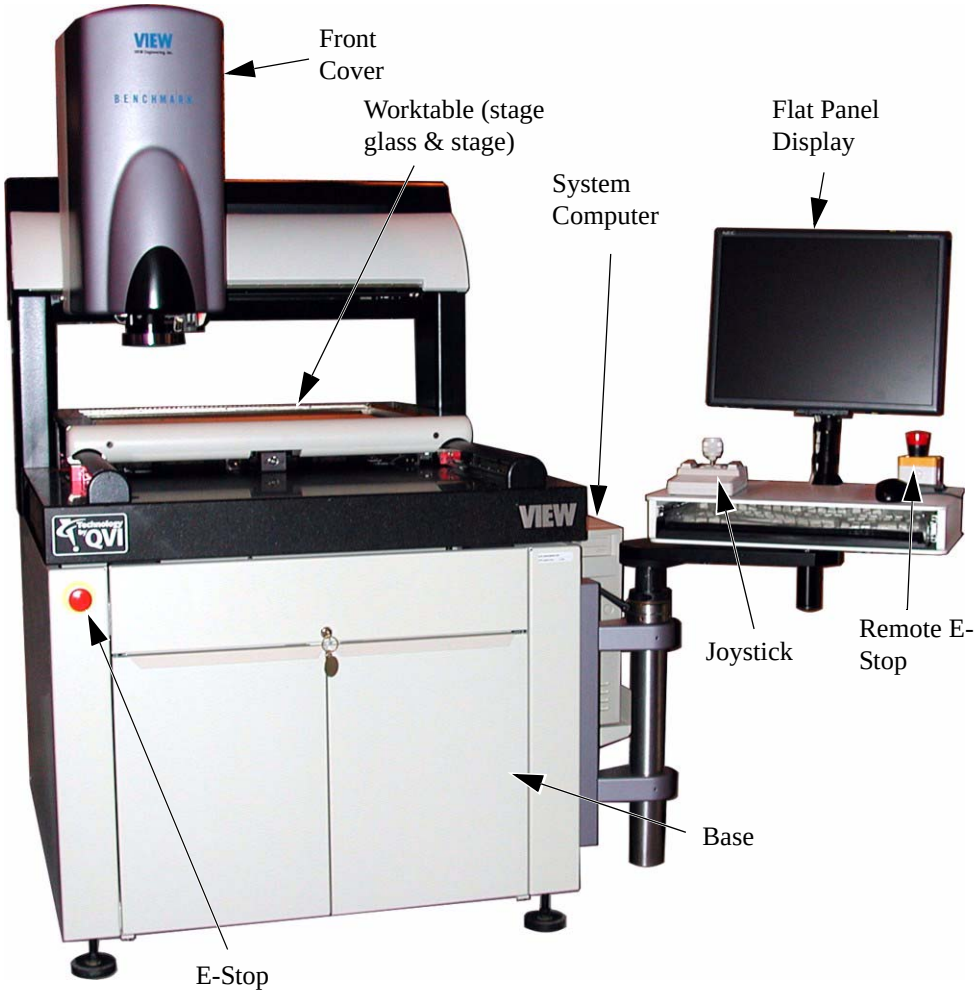


Figure 2-1 Benchmark 450 System Components

Caution: Do not store items inside the base of the machine, which could result in X motion problems if the items interfere with the IGUS track inside the base.

2.4 How the System Operates

Based on the Windows XP operating system, the Benchmark 450 system comes installed with its own proprietary application software, image processing hardware, an easy-to-use graphical user interface, and a full range of dimensional measurement tools. The following describes a typical processing operation.

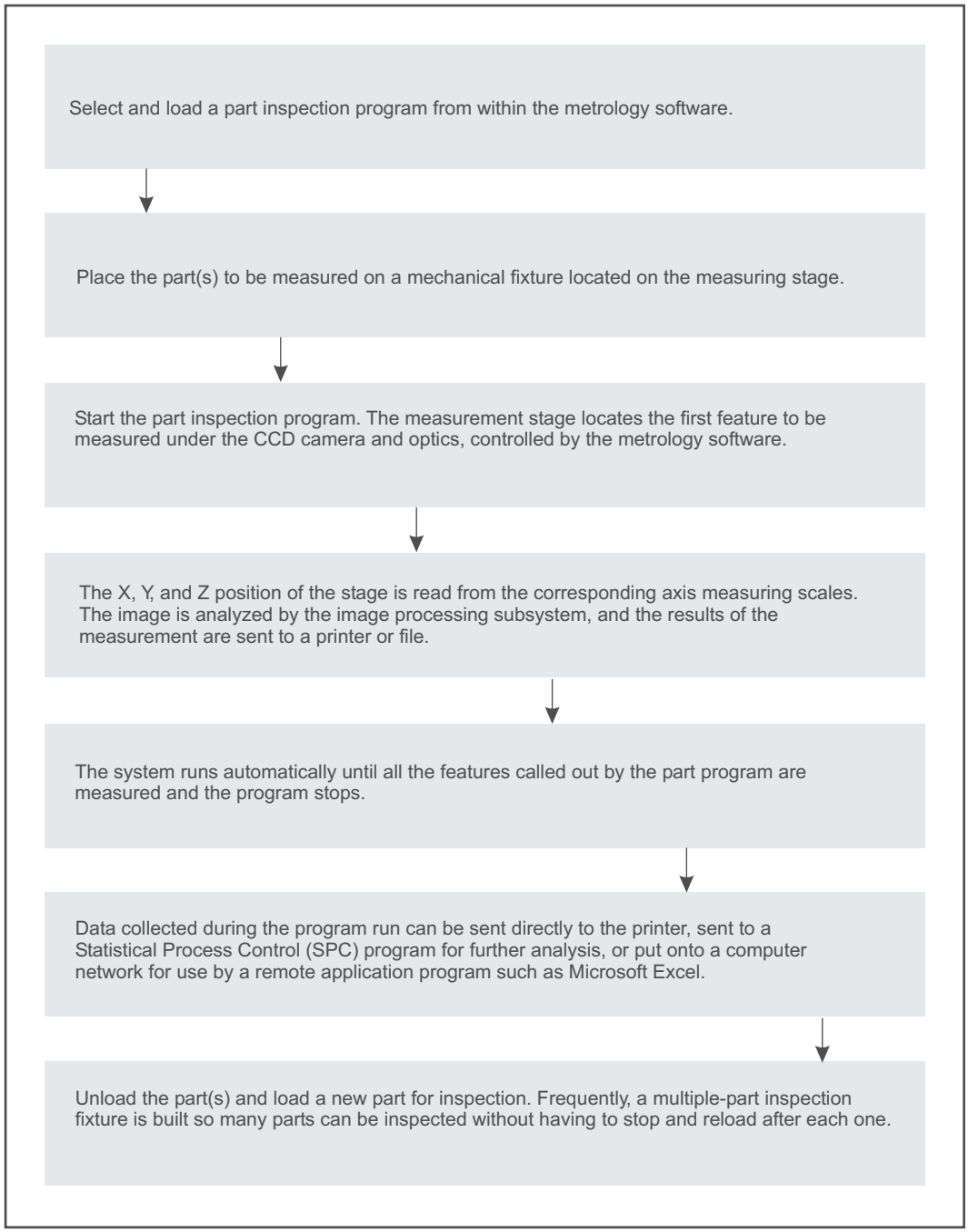


Figure 2-2 Benchmark 450 Operation

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Safety Information

Chapter 3

3.1 What This Chapter Contains

This chapter covers the following:

- Emergency Stops
- System Status LEDs
- System Power
- System Lockout
- Safety Guidelines

Also, be sure to review the information about *Important System Labels* on page iii.

3.2 Emergency Stops

Activate the emergency off (EMO) circuit by pressing the remote E-Stop on the workstation (see Figure 3-1) or the E-Stop on the front of the machine.

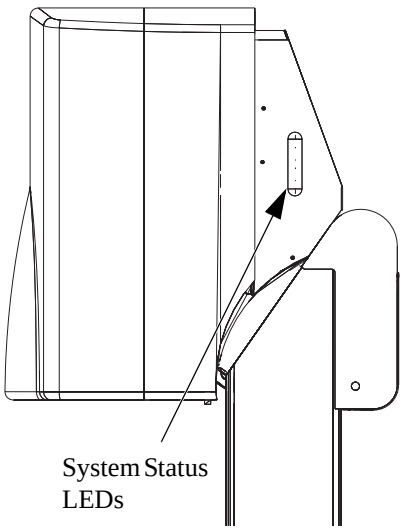
Figure 3-1 Remote E-Stop

The EMO circuit is responsible for disabling system motion in case of an emergency. The EMO circuit places the system in a safe (shutdown) condition, which cuts power to the motors.

3.3 System Status LEDs

The system status LEDs are located on the right-hand side of the Z-axis cover.

- The top LED is (yellow) is the Stop LED
- The middle LED (green) is the Power On LED
- The bottom LED (blue) is the Laser Indicator LED (only present is if system is equipped with a laser).



The following table includes information regarding the status of the Stop LED and provides instructions for recovering from different Stop conditions.

Stop LED Status	Description	Cause	How to Recover
Off	System is in normal operation	—	—
On	Recoverable stop	Occurs during the normal power-up sequence until the Stop/Start button on the joystick is pressed	When prompted, press the **Stop/Start** button on the joystick.
		Occurs when the X, Y, or Z transport encounters an end-of-travel limit	Move the transport off of the limit, and then press the **Stop/Start** button on the joystick
		Occurs when servo parameter settings are incorrect	Check LED DS7 on the DSP Multi Axis PCBA for the source of the E-Stop.
		Occurs when the remote E-Stop is pressed	Reset the remote E-Stop switch by twisting the knob in the direction of the arrows, and then press the **Stop/Start** button on the joystick.

3.4 System Power

The system comes with an IEC power strip (P/N 037545) and three identical power cords (P/N 019978) that connect the monitor, system computer, and machine to the power strip. An external power cord connects the power strip to the external power source (outlet). External power cord characteristics vary depending on the country of installation, as outlined in the table below.

Warning: Always use the IEC power strip and the external power cords provided with the system. Use of an inappropriate power connection could lead to equipment damage and/or electrical shock.

Country	Power	Part Number	Type	AWG (US)	Wire Cross Section (CE)
United States	120 VAC, 50/60 Hz	019938	3-Conductor	18	0.82 mm^2
Japan	100 VAC, 50 Hz	019938	3-Conductor	18	0.82 mm^2
United Kingdom	240 VAC, 50 HZ	019971	3-Conductor	18	1.00 mm^2
Italy	220 VAC, 50 HZ	019972	3-Conductor	18	1.00 mm^2
Denmark	220 VAC, 50 HZ	019974	3-Conductor	18	1.00 mm^2
Switzerland	220 VAC, 50 HZ	019975	3-Conductor	18	1.00 mm^2
Other European Countries	220 VAC, 50 HZ	019973	3-Conductor	18	1.00 mm^2

The main power fuse is located in the fuse holder that is part of the machine power cord receptacle assembly. A fuse label indicating the type of fuse installed in the fuse cartridge is located near the fuse holder.

- Systems configured for 100/120 volt operation have one 10 Amp, 250 Volt, Slo Blo fuse
- Systems configured for 200/240 volt operation have two 6.3 Amp, 250 Volt, Slo Blo fuses

3.5 System Lockout

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

Most companies have a safety department and written procedures for locking out the system. These procedures typically have the following features as a minimum:

- Each operator, supervisor, and maintenance person who may be required to work on the machine shall have a key operable lock.
- If more than one key exists for the lock, the owner of the lock shall have possession of all of the keys.
- Each lock shall be labeled with the owner's name, or the owner shall be supplied with an identity tag that may be attached to the lock when it is applied to the machine.

To lock out the system:

1. Close all programs and shut down Windows.
2. Power down the monitor.
3. Press the remote E-Stop.
4. Unplug the main power cord from the power source and lock the plug into an appropriate energy isolating device.
5. Perform the required service and/or maintenance.

Note: Each person performing maintenance or making adjustments to the system should have their own lock attached to the energy isolating device. There are commercially available multi-lock devices to allow this.

To resume normal operation:

1. After determining it is safe, have each person remove his or her own lock.
2. When all locks are removed, reconnect the power cord to the main power source.
3. Reset the remote E-Stop by twisting the knob in the direction of the arrows.
4. Power up the system and resume normal operation.

3.6 Safety Guidelines

For your personal safety, observe the following safety precautions and guidelines. They are provided for your protection and to help prevent damage to the system.

General Precautions:

- The system is intended to be used by personnel who recognize the hazards associated with electrical shock and computer-controlled mechanical motion.
- The system is intended to be used for metrology applications only; other use may void your warranty.
- To prevent the accidental pinching of your hands, do not approach or touch the machine during operation.
- To avoid personal injury, never attempt to manually move the Z-axis slide with power applied to the machine.
- To avoid personal injury, always mount the part(s) you are measuring or inspecting in a fixture that is secured to the worktable.
- Always power down and lock out the system before servicing it.

Power and Grounding:

- Ensure that the source of power connected to the system does not apply more than the rated voltage (specified by VIEW Engineering, Inc.) between the supply conductors or between either supply conductor and ground.
- The system is grounded through the power cord. To avoid electrical shock, connect the power cord to a properly wired receptacle with an earth ground connection.
- Connect the system to a dedicated circuit.

Power Cord:

- Only use the power cord and connector specified for the system.
- Do not operate the system if the power cord is damaged.
- Position the power cord so it will not be a trip hazard, or come in contact with a hot surface.

Miscellaneous:

- To avoid a fire hazard, only use fuses that meet all type, voltage, and current requirements specified by VIEW Engineering, Inc.
- Do not operate the system without all covers and panels installed properly.
- Keep water and other liquids away from the system to reduce the risk of spillage and electrical shock.
- Do not use any accessory attachments other than those provided or approved by VIEW Engineering, Inc. Improper accessories can cause fire, electrical shock, and/or personal injury.
- Do not drop anything on the stage glass.

Unsafe Operating Environments:

- Do not operate the system in hospitals, clinics, or laboratories where sensitive patient monitoring equipment may be affected.
- Do not operate the system in a radioactive environment because the electronics in the machine are not radiation-hardened.
- 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 that may be generated by the system.

Installation

Chapter 4

4.1 What This Chapter Contains

This chapter covers the following:

- Choosing an Installation Site
- Unpacking the Machine
- Removing the X, Y, and Z Restraints
- Connecting the System
- Installing the Stage Glass
- Leveling the Stage Glass

4.2 Choosing an Installation Site

Before installing the system, choose a site that meets the following criteria:

Specification	Requirement:
Temperature	Recommended operating range: 17° to 33°C Rated environment: 18° to 22°C
Humidity	30% to 80% non-condensing Condensation can cause corrosion
Vibration	<0.0015g below 15Hz In order to maintain system accuracy, do not locate the system near to production equipment susceptible to vibration (for example: stamping presses, mills, or lathes).
Weight	Crated: 750 kg (1,650 lbs) Uncrated: 610 kg (1,345 lbs)
Electrical Requirements	115/230 VAC, 50/60 Hz, 700 W
Dimensions (W x D x H)	Machine: 99.8 x 142.5 x 176.6 cm (39.3" x 56.1" x 69.6") w/Computer Shelf: 131.7 x 142.5 x 176.6 cm (51.9" x 56.1" x 69.6") w/Integrated Workstation: 174.8 x 142.5 x 176.6 cm (68.6" x 56.1" x 69.6") Make sure there is adequate space for an operator to spread out materials and use the system comfortably.
Service access	Allow 61 cm (24") clearance around the machine for cables and service access.

The Benchmark 450 system does not require air, steam, or exhaust. Vacuum and/or air may be required for special fixtures only.

4.3 Benchmark 450 System Layout

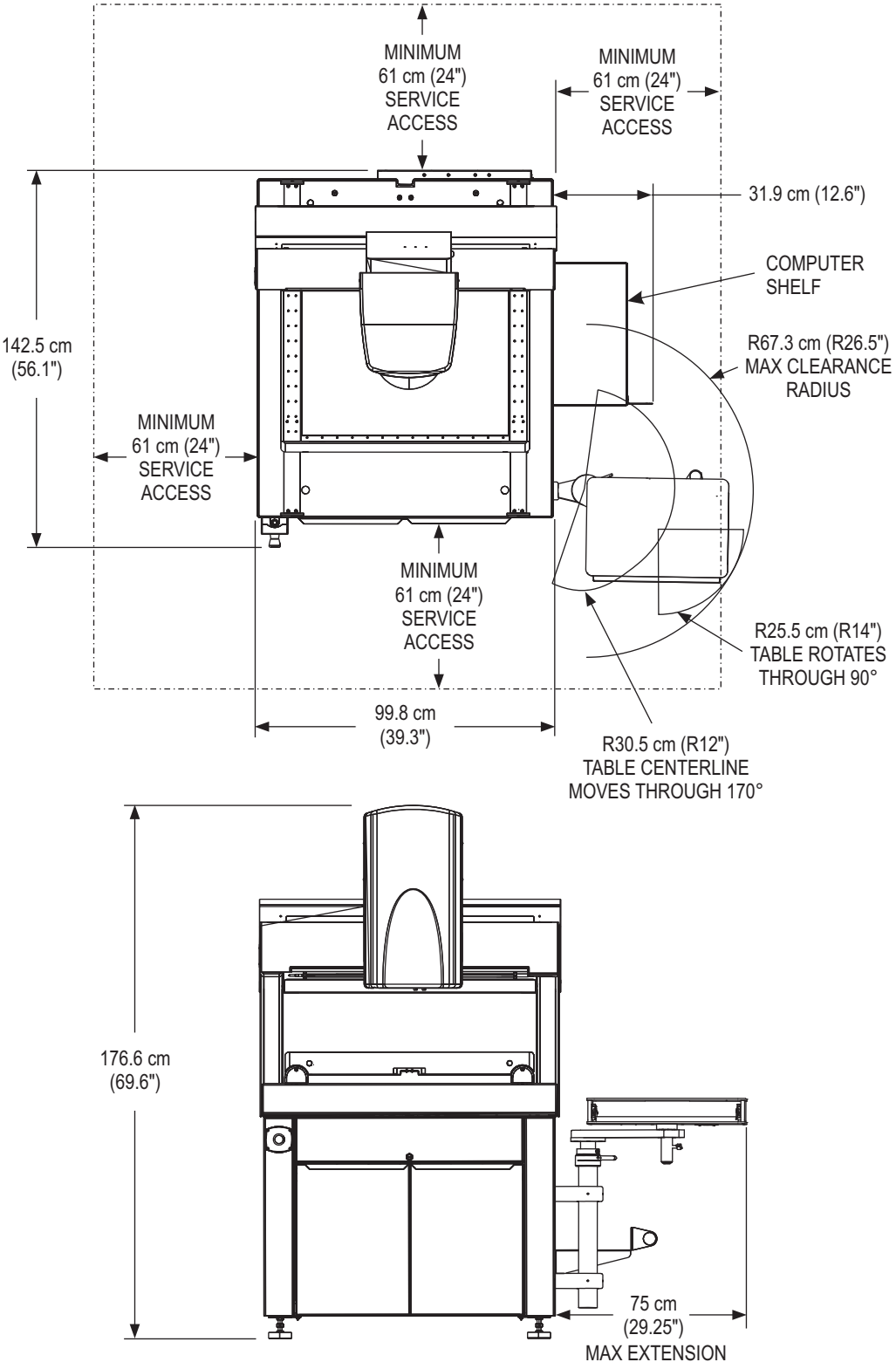


Figure 4-1 Benchmark 450 System Layout

4.4 Unpacking the Machine

When you receive the system, the shipment will include a pallet that contains the machine, computer equipment, and any optional accessories.

The pallet will be:

- Cardboard sleeved if the system is shipped to **Domestic locations** (United States, Canada, and Mexico)
- Crated if the system is shipped to **International locations** (all other countries)

Note: The specific packing of your machine may vary from the following instructions. The procedure outlined below provides general unpacking instructions.

Note: Before unpacking the machine, be sure to review the table on the previous page for information about equipment dimensions, space requirements, and environmental considerations.

Tools Required

Forklift capable of lifting 900 kg (2,000 lbs)
Utility knife
Large diagonal cutters
3/4-inch socket or adjustable crescent wrench
Bubble level

Warning: Lift the pallet from the front side of the pallet, which is clearly labeled. If the crating material or cardboard sleeve is removed, lift the pallet from the left or right side of the machine because that is where the maximum weight is centered.

1. *[Domestic Installations]* Remove the top of the shipping carton and remove the cardboard sleeve by lifting it straight up. The cardboard sleeve is stapled to the pallet.

   [International Installations] Disassemble the shipping crate.

2. Drive a forklift capable to the left or right side of the machine and lift the pallet straight up. Move the machine, on the pallet, as close as possible to the final location where the system will be installed.

3. Remove the external packing material from the machine.

4. Carefully remove the following items from the pallet:

   - Stage glass
   - Accessory boxes (the number of boxes may vary, depending on the equipment ordered)
   - Workstation carton (only applies to systems with the stand-alone workstation)

5. Use the supplied key to unlock and open the front doors on the base.

6. Locate the four shipping bolts that secure the machine to the pallet (see Figure 4-2).

7. Use a 3/4-inch socket or adjustable crescent wrench to remove the four bolts that secure the machine to the pallet.

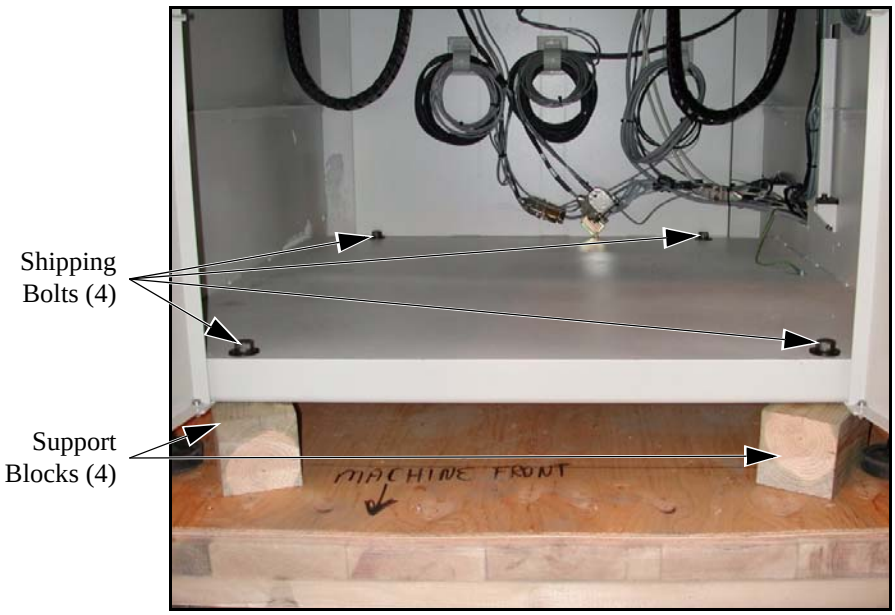


Figure 4-2 Removing the Shipping Bolts that Secure the Machine to the Pallet

Warning: Lift the machine from the back because that is where the maximum weight is centered.

8. Drive a forklift to the back of the machine and position the forks under the support rails on the bottom of the machine.

9. Slowly lift the machine off of the pallet.

10. Remove the support blocks and pallet. Store them for future use.

11. Use the forklift to move the machine to the final operating location and slowly lower it until it is approximately 15 cm (6") above the floor.

12. Set the height of each machine support to 7.5 cm (3") and move the machine to the final operating location.

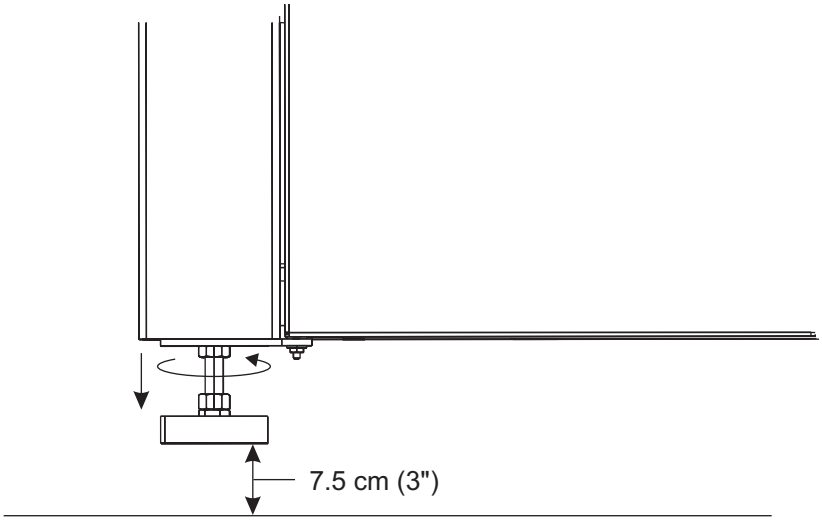


Figure 4-3 Leveling the Machine

13. Slowly lower the machine onto the floor so it is resting on all four machine supports.

14. Set a bubble level on the worktable to determine if the machine is level in the X and Y directions. If the machine is not level in both directions, lift the machine, 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 worktable is level in the X and Y directions.

15. Remove any remaining packing material.

4.5 Removing the X, Y, and Z Restraints

After unpacking the machine, you must remove the X, Y, and Z shipping restraints. Each restraint has a caution tag attached to it to show its location.

Caution: Do not attempt to drive the X, Y, and Z transports with the shipping restraints installed. Possible damage to the machine can occur.

Note: Do not lose the shipping restraints. You will need them if you ever need to move the machine.

Tools Required

Set of English Allen wrenches
Set of Metric Allen wrenches
Phillips-head screwdriver

1. Go to the back of the machine and open the rear bridge cover with a Phillips-head screwdriver. Locate the red shipping restraint that is attached to the X-axis rail (see Figure 4-4).
2. Use a 3/16-inch Allen wrench to **loosen** (do not remove) the four socket-head cap screws (see Figure 4-4) that secure the shipping restraint to the rail. Remove the shipping restraint and set it aside.
3. Close the rear bridge cover and tighten the two Phillips-head screws.

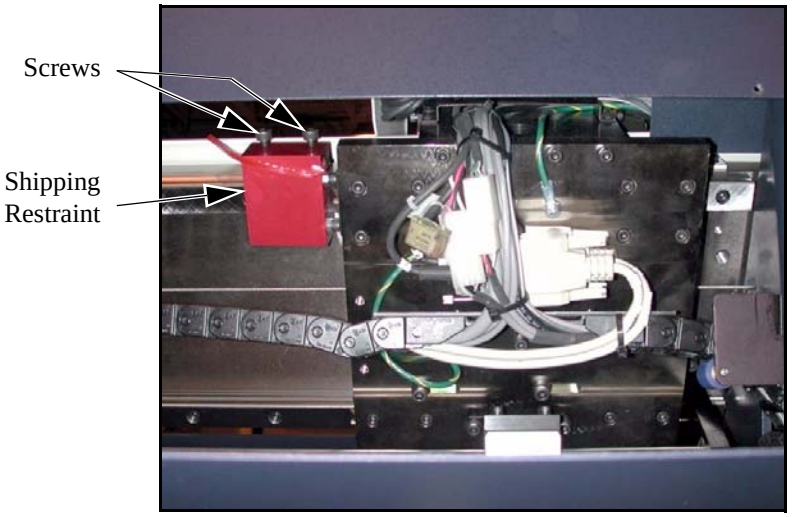


Figure 4-4 Removing the X-Axis Shipping Restraint (Rear View)

4. Locate the red shipping restraint attached to one of the Y-axis rails, in front of the worktable. This restraint may be located on either side of the machine — in Figure 4-5 below, it is shown attached to Y-axis rail on the left side of the machine.

5. Use a 3/16-inch Allen wrench to **loosen** (do not remove) the two socket-head cap screws that secure the shipping restraint to the Y-axis rail. Remove the shipping restraint and set it aside.

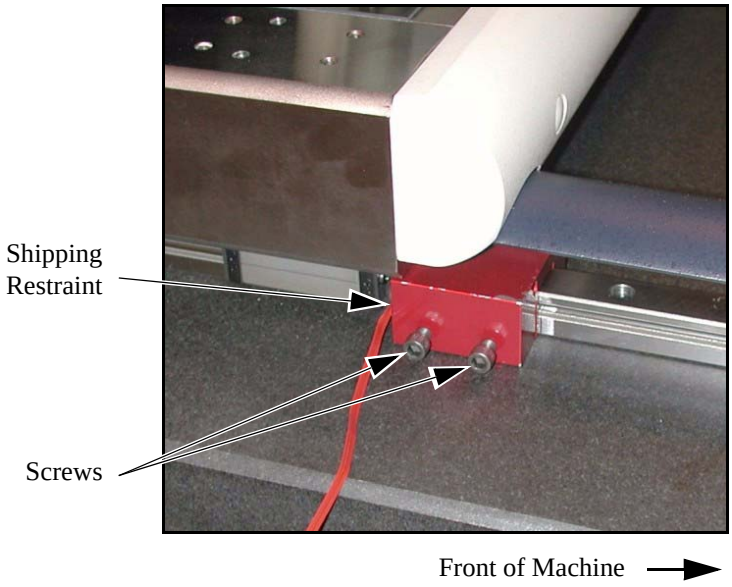


Figure 4-5 Removing the Y-Axis Shipping Restraint

6. Locate the Z-axis shipping restraints attached to the bottom of the Z-axis slide (see Figure 4-6).

7. Use a 3 mm Allen wrench to remove the four Z-axis end stop screws that secure the shipping restraints to the Z-axis slide.

8. Remove both Z-axis shipping restraints (and four end stops).

Caution: Do not lose the four end stops. They are essential to the operation of the Z-axis transport.

Caution: Do not move the Z-axis transport before performing the next step.

9. Use a 3 mm Allen wrench and the end stop screws removed in Step 7 to re-install the four end stops. Make sure the end stop on the left side of the Z-axis slide (shown in Figure 4-6) does not interfere with the Z-axis scale.

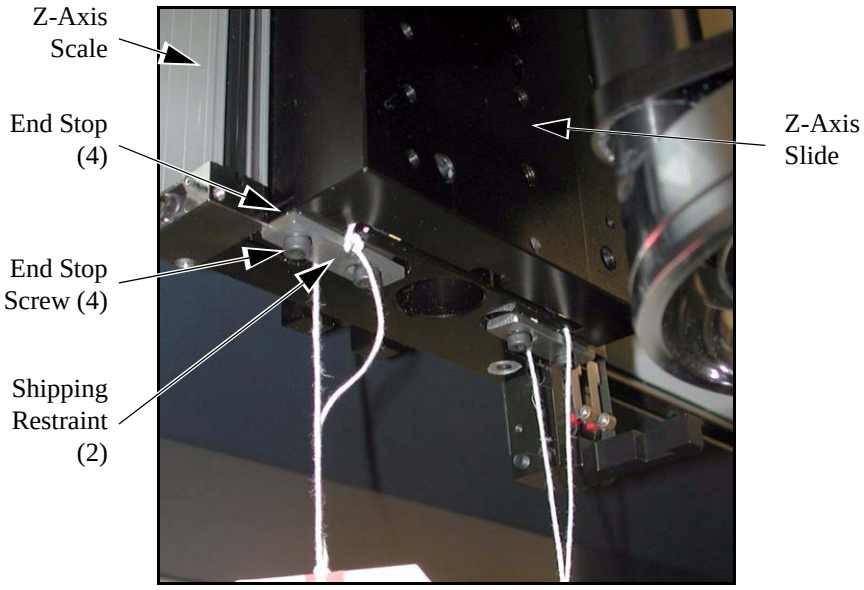


Figure 4-6 Removing the Z-Axis Shipping Restraints

4.6 Connecting the System

Tools Required
Diagonal cutters
Small, flat-head screwdriver

1. Unpack the system components and accessories.

- For systems equipped with the stand-alone workstation, unpack the workstation and assemble it according to the instructions provided with the workstation. Place the workstation on the right-hand side of the machine. Unpack the system computer, monitor, joystick, mouse, keyboard, and remote E-Stop. Place everything in their respective areas on the workstation.
- For systems equipped with the integrated workstation, unpack the system computer and remote E-Stop. Place the system computer on the computer shelf attached to the right side of the machine and place the remote E-Stop on the workstation. (The computer peripherals are shipped on the workstation, which is already attached to the machine.)

2. Connect the system components as shown below and outlined on the next page. All cables are clearly marked regarding function and where each connects.

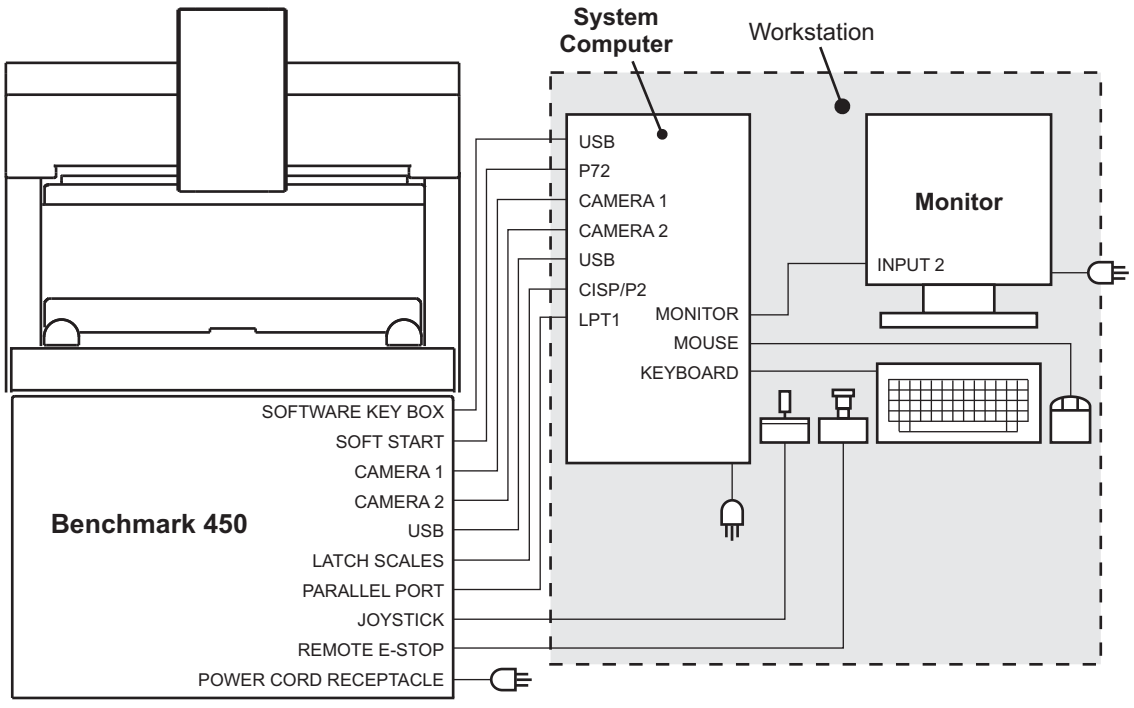


Figure 4-7 Benchmark 450 System Cabling

Connect the…	to the…	and the…
Joystick (P/N 039037)	**JOYSTICK** connector on the machine	—
Remote E-Stop (P/N 039836)	**REMOTE E-STOP** connector on the machine	—
Keyboard (P/N 036821)	Purple keyboard connector on the system computer	—
Mouse (P/N 035136)	Green mouse connector on the system computer	—
Monitor cable	**INPUT 2** connector on the monitor	**MONITOR** connector on the system computer
Soft Start Extension cable (P/N 049012.08)	**SOFT START** connector on the machine	**P72** connector on the system computer
Camera 1 cable (P/N 060155-1)	**CAMERA 1** connector on the machine	**CAMERA 1** connector on the system computer
Camera 2 cable (P/N 060131.01)	**CAMERA 2** connector on the machine	**CAMERA 2** connector on the system computer
Parallel cable (P/N 036389)	**PARALLEL PORT** connector on the machine	**LPT1** connector on the system computer
Latch Scales cable (P/N 049022.19)	**LATCH SCALES** connector on the machine	**CISP/P2** connector on the system computer
USB cable (060158.04)	USB connector on the machine	USB connector on the system computer
Software Key Box (attached to the machine)	USB connector on the system computer	—
USB cable	USB connector on the monitor	USB connector on the system computer
Power cord (machine)	Machine	IEC power strip
Power cord (system computer)	System computer	IEC power strip
Power cord (monitor)	Monitor	IEC power strip
Power cord (IEC power strip)	IEC power strip	Appropriate power outlet

4.7 Installing the Stage Glass

Tools Required
Set of Metric Allen wrenches
Glass cleaner
Soft, lint-free toweling

1. Locate and unwrap the stage glass.
2. Clean both sides with glass cleaner and soft, lint-free toweling.
3. Carefully set the back edge of the stage glass onto the back recessed ledge in the stage opening. Reach under the front of the stage to support the front of the glass as you slowly lower the glass into position (see Figure 4-8).

Caution: Do not overtighten the set screws that secure the stage glass in the stage. Excessive pressure may damage the stage glass.

4. Verify that the glass is centered within the stage and tighten (do not overtighten) the set screws in the back of the stage.

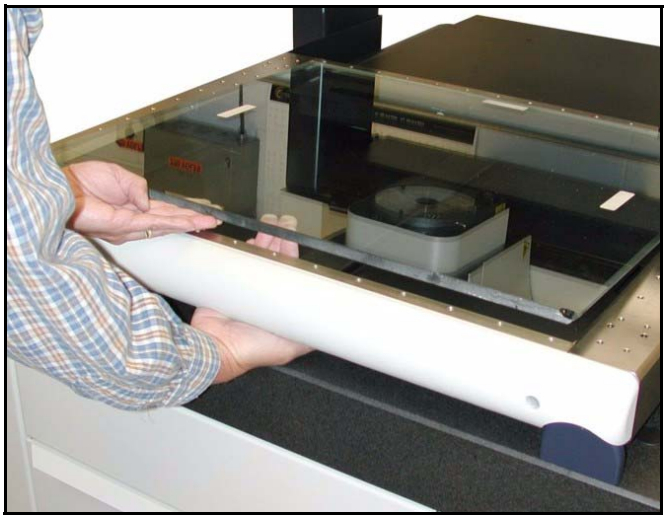


Figure 4-8 Installing the Stage Glass

4.8 Leveling the Stage Glass

Tools Required

Set of Metric Allen wrenches
Masking tape (or similar tape)
0.010" shim stock
Bracket with a straight bottom edge (4)

1. Power up the system as outlined on page 32.
2. Attach four pieces of masking tape (or similar tape) to the stage glass in the approximate locations shown in Figure 4-9.

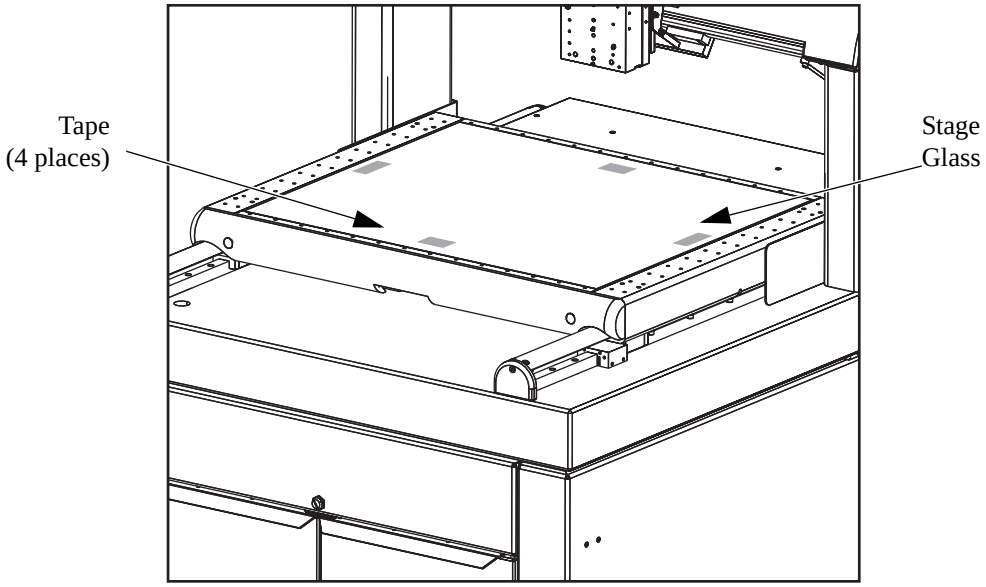


Figure 4-9 Tape Locations on the Stage Glass

3. Determine whether or not the stage glass is level in the X direction by doing the following:

a. Drive the stages so an edge of the tape on the left side of the stage glass appears centered in the Video window.

b. Use the Autofocus Finder to focus on the edge of tape at high magnification.

c. Zero the DRO and drive the stages so an edge of the tape on the right side of the stage glass appears centered in the Video window.

d. Use the Autofocus Finder to focus on the edge of tape at high magnification. Look at the Z-axis readout, which should be as close to zero as possible.

– If the reading is within **±0.08 mm (±0.003")**, the stage glass is level in the X direction.

– If the reading is not within specification, the stage glass needs to be leveled.

4. Repeat Step 3 to determine whether or not the stage glass is level in the Y direction, using the pieces of tape on the front and back of the stage glass. Again, look at the Z-axis readout, which should be as close to zero as possible.

- If the reading is within **±0.08 mm (±0.003")**, the stage glass is level in the Y direction.
- If the reading is not within specification, the stage glass needs to be leveled.

If the stage glass needs to be leveled in the X and/or Y directions, continue with the rest of this procedure. Otherwise, stop here.

5. Drive the Y-axis stage to the front limit of travel.

6. Shut down the system and disconnect the power cord from the power source.

7. Remove the stage glass and carefully set it aside.

8. Usa a 5 mm Allen wrench and a 3 mm Allen wrench to remove the front stage cover and both Y-axis rail covers (see Figure 4-10).

9. Use a 2.5 mm Allen wrench to remove the underlight tray cover.

10. Re-install the stage glass. Make sure the stage glass is centered within the stage.

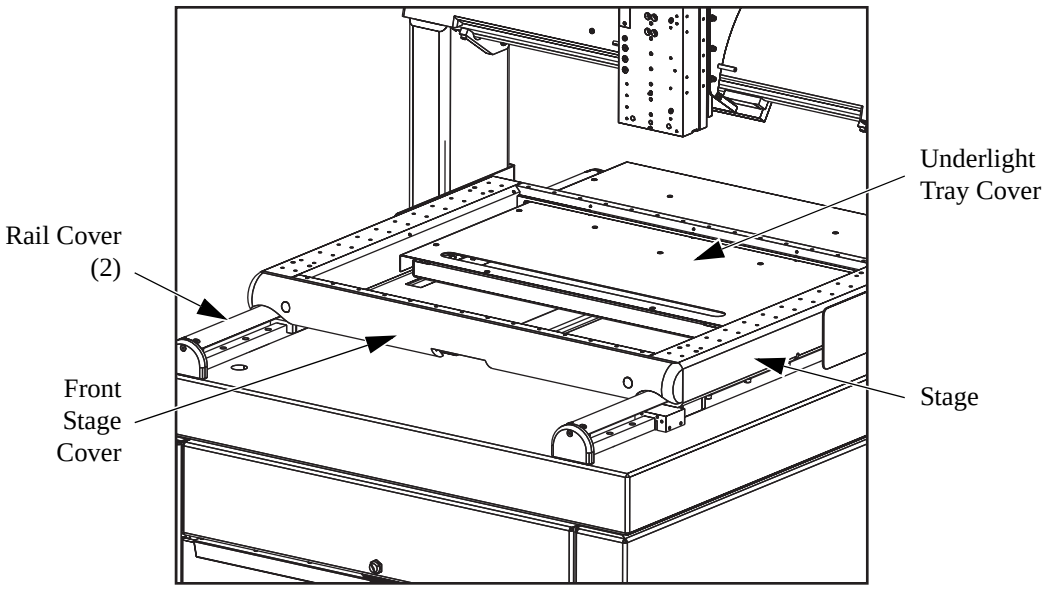


Figure 4-10 Removing the Front Stage Cover, Y-Axis Rail Covers, and Underlight Tray Cover

Note: In order to access the stage glass leveling screws, you must remove the front stage cover, both Y-axis rail covers, and the underlight tray cover.

11. Attach a bracket with a straight bottom edge to each corner of the stage. Then place 0.010" shim stock between each bracket and the stage glass (see Figure 4-11).

Note: Using 0.010" shim stock ensures that the top surface of the stage glass is below the top surface of the stage.

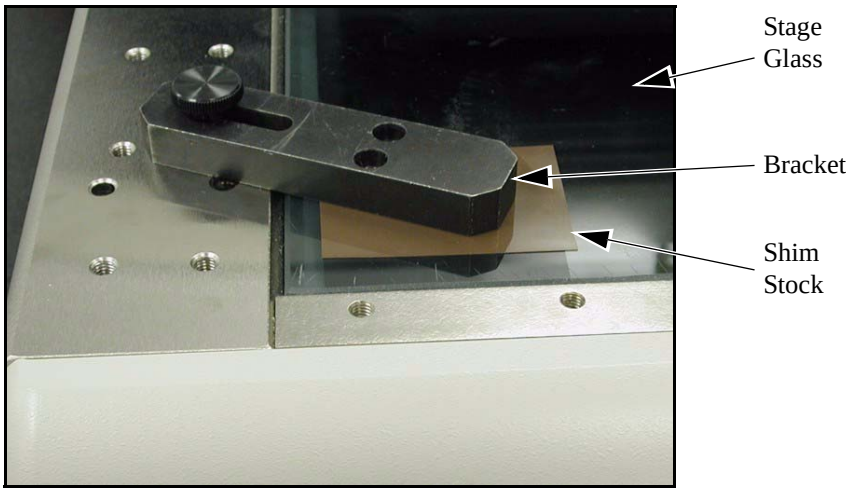


Figure 4-11 Bracket Attached to the Stage

12. Use a 3 mm Allen wrench to **loosen** the six nylon-tipped stage glass support screws (accessed from below the stage); see Figure 4-12. Use the access holes on the sides of the stage to access the two middle screws.

13. Use a 2 mm Allen wrench to adjust the six leveling screws (accessed from below the stage) as necessary to position the stage glass the correct distance below the top surface of the stage.

14. Tighten the six support screws so they just touch the stage glass. Do not overtighten the screws, which could affect the leveling of the glass.

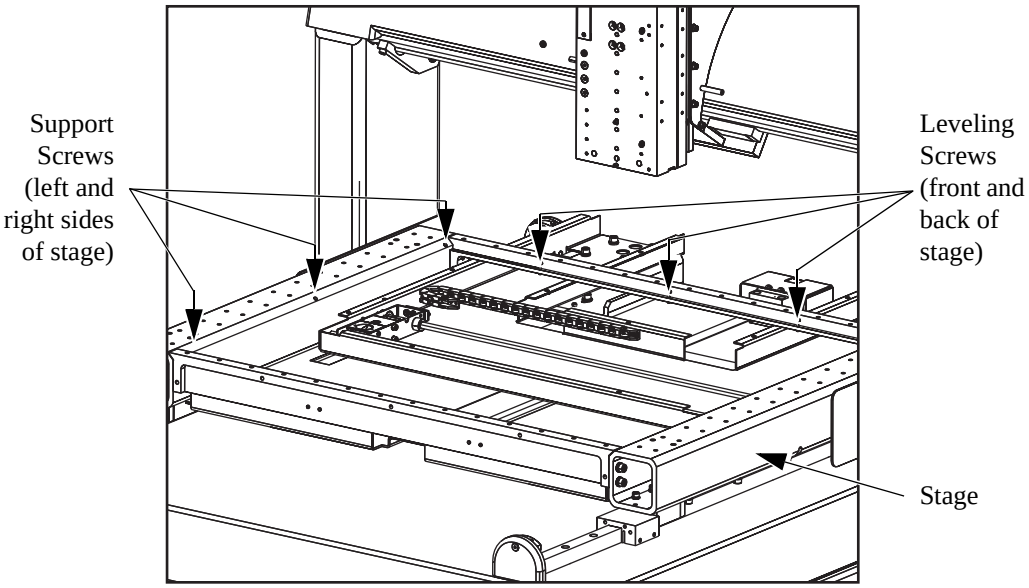


Figure 4-12 Location of Stage Glass Leveling Screws

15. Remove the four brackets and shim stock.

16. Power up the system and perform Steps 1 through 4 to verify that the stage glass is level in both the X and Y directions. If necessary, repeat Steps 11 through 15 to re-level the glass.

17. Repeat Step 16 as many times as necessary to level the stage glass.

Caution: When re-installing the underlight tray cover, be careful not to remove the rubber washers glued to the underlight tray.

18. Carefully remove the stage glass and re-install the underlight tray cover.

19. Re-install the stage glass (make sure it is centered within the stage).

20. Perform Steps 1 through 4 to verify that the stage glass is still level in both the X and Y directions.

- If the stage glass is level, shut down the system and disconnect the power cord from the main power source. Then tighten (do not overtighten) the set screws in the back of the stage.
- If the stage is not level, repeat Steps 11 through 19 to re-level the glass.

21. Re-install the front stage cover and both Y-axis rail covers.

22. Remove the tape from the stage glass.

System Startup & Shutdown

Chapter 5

5.1 What This Chapter Contains

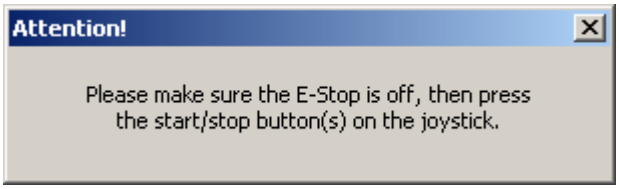
This chapter covers the following:

- System Power-Up Procedure
- System Shutdown Procedure
- Stopping Stage Motion
- Operation Checks
- Running a Part Inspection Program
- Fixture Mounting Holes

5.2 System Power-Up Procedure

1. Make sure the system components are connected and the main power cord is plugged into an appropriate power source (outlet).
2. Turn the machine power switch to the ON position.
3. Power up the monitor, system computer, and any optional accessories.
4. Double-click the  icon on the Windows Desktop.

   The following appears:



5. Verify that the E-Stops are not pressed in.
6. Press the **Stop/Start** button on the joystick.

5.3 System Shutdown Procedure

Caution: The system must be shut down properly to prevent data loss.

To exit the VMS software, do either of the following:

- Click the **X** in the top right corner of the VMS screen
- Select **File** / **Exit** in the VMS main menu

To shut down Windows XP and power down the system, do the following:

1. Close all programs.
2. Perform the standard Windows XP shutdown procedure.
3. Power down the monitor and any optional accessories.

5.4 Stopping Stage Motion

If you encounter an emergency while operating the system, press either the remote E-Stop (see Figure 5-1) or the E-Stop on the front of the machine (see Figure 5-2) to cut power to the motors and immediately stop system operation.

Caution: After activating an emergency stop, contact your supervisor to investigate the problem. Do **not** remove power from the computer, which could cause improper shutdown of the software and damage files.

To resume normal operation, reset the E-Stop by twisting the knob in the direction of the arrows. Then press the **Stop/Start** button on the joystick.

Figure 5-1 Remote E-Stop

Figure 5-2 E-Stop on the Front of the Machine

5.5 Operation Checks

After powering up the system and launching the metrology software, you should verify that it performs as expected. If the system fails any of the following operation checks, verify all connections are correct and secure. If the system still does not perform as described below, contact the Customer Support HelpDesk.

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

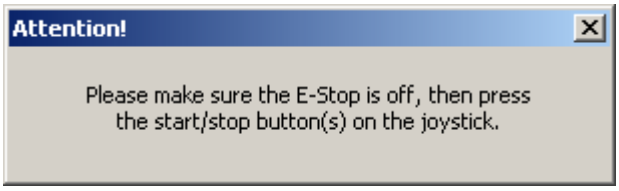
Action	Result
Press the remote E-Stop.	• The system enters E-Stop Mode — the yellow LED on the right side of the Z-axis cover illuminates. • A software message appears on the screen. • The X, Y, and Z transports do not move when you operate the joystick. To resume normal operation: 1. Clear the software message. 2. Reset the E-Stop switch by twisting the knob in the direction of the arrows. 3. Press the **Stop/Start** button on the joystick.
Move the joystick lever in any direction.	The X and Y axis transports move in the same direction.
Twist the joystick knob CW.	The Z-axis transport moves down.
Twist the joystick knob CCW.	The Z-axis transport moves up.
Press the **Stop/Start** button on the joystick.	• The system enters Stop Mode — the yellow LED on the right side of the Z-axis cover illuminates. • A software message appears on the screen. • The X, Y, and Z transports do not move when you operate the joystick. To resume normal operation: 1. Clear the software message. 2. Press the **Stop/Start** button on the joystick.
Adjust the illumination levels in the software.	The intensity of the selected illuminator should change as expected.

5.6 Running a Part Inspection Program

Caution: Only fully trained and authorized personnel should operate the system.

1. Launch the VMS metrology software by double-clicking on the VMS icon on the Windows Desktop.

   The following prompt appears:



2. Verify that the E-Stops are pulled out.

3. Press the **Stop/Start** button on the joystick.

   The software loads, and something similar to the following appears:

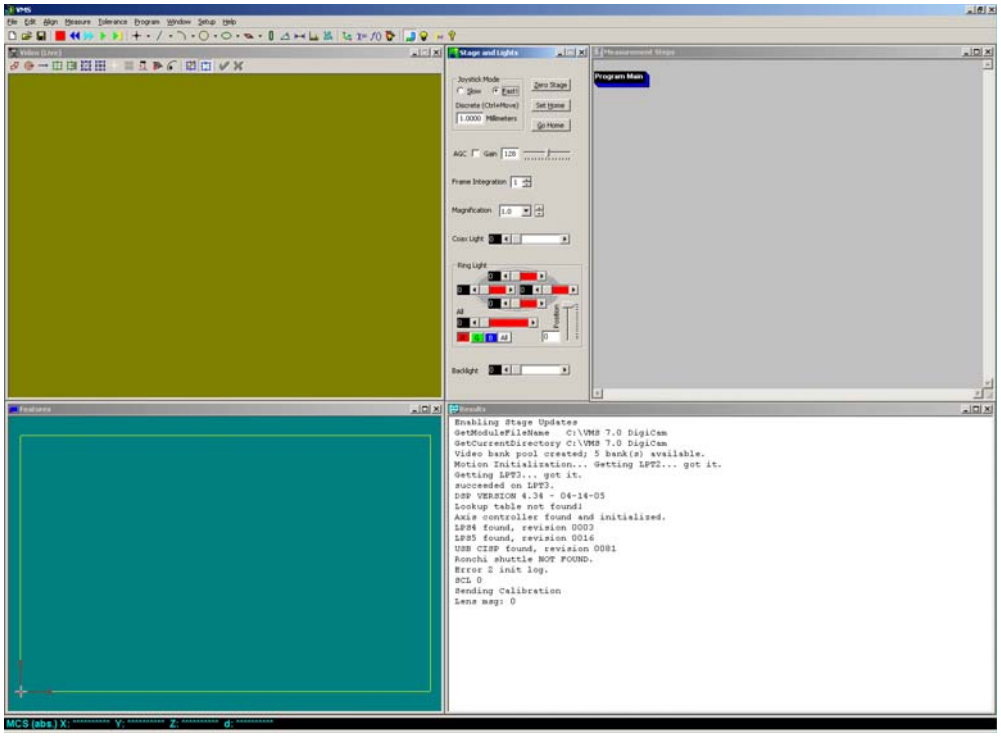


Figure 5-3 Initial VMS Screen

4. Click **Zero Stage** in the VMS Stage and Lights window.

   The stages move to their home positions — first the Z-axis, then the Y-axis, and finally the X-axis. After the stage home sequence, the system moves the optical assembly to its original position. Do not place anything on the stage that will interfere with this movement.

   After the stages are zeroed, joystick control becomes active and the system is ready for use.

5. Click  in the VMS toolbar and open the part program you want to run.

6. Place the part to be inspected directly on the worktable or in a part fixture.

7. If the part has to be aligned manually before running the program, use the joystick to drive the stages, and follow the movement in the Video window, until the feature is in position in the camera field of view.

8. Click  in the VMS toolbar to run the program automatically.

9. To inspect more parts, using the same program, repeat Steps 6, 7, and 8. Measurement results will be saved in the Results window and can be output if required.

10. To run a different program, go back to Step 5.

11. When the program has finished and you no longer want to run any programs, select **File / Exit** in the VMS main menu to exit the software.

Note: You can leave the system in this condition if it is temporarily not being used. However, if the system will not be used for an extended period of time, we recommend powering it down as described on page 32.

5.7 Fixture Mounting Holes

Use the M6 tapped holes along the each side of the worktable to mount fixtures to the worktable for securing and orientating parts. Any combination of holes can be used to attach a variety of fixtures.

Caution: Do not allow any objects to hang over the sides of the worktable while operating the machine. Doing so could result in equipment damage if the object makes contact with the fixed bridge supports.

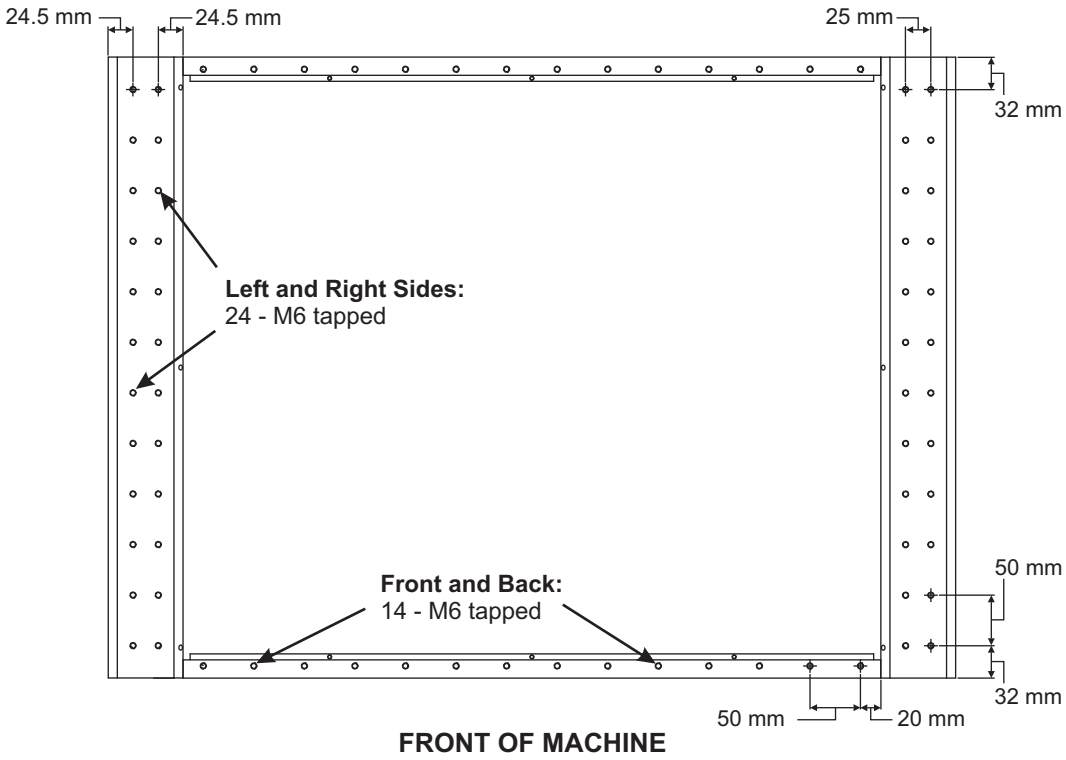


Figure 5-4 Benchmark 450 Stage Fixturing Holes

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